

Electromagnetic Compatibility Test Report

Prepared in accordance with

FCC Part 15: October 2007, RSS-210: June 2007

On

Electronic Article Surveillance Detection System Evolve Antenna Family with Accessories

Prepared for:

Checkpoint Systems Inc.



101 Wolf Drive

Thorofare, NJ 08086

Prepared by:

TUV Rheinland of North America, Inc.

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TÜV Rheinland test mark. This report must not be used by the applicant to claim product endorsement by TÜV Rheinland, NVLAP or any agency of the United States Government.

Auftraggeber: <i>Client:</i>		Checkpoint Systems Inc. 101 Wolf Drive Thorofare, NJ 08086	Bayode Olabisi (856) 251-2141 / (856) 384-2366 bayode.olabisi@checkpoint.com
Bezeichnung: <i>Identification:</i>	Electronic Article Surveillance Detection System	Serien-Nr.: <i>Serial No.</i>	See Section 3.5
Gegenstand der Prüfung: <i>Test item:</i>	Evolve Antenna Family with Accessories	Prüfdatum: <i>Date</i>	7/22/09
Prüfort: <i>Testing location:</i>	TUV Rheinland of North America 12 Commerce Road Newtown, CT 06470-1607 U.S.A.		
Prüfgrundlage: <i>Test specification:</i>	Emissions: FCC Part 15 Subpart C: October 2007 / RSS-210: June 2007 FCC Part 15 Subpart 15.223/RSS-210 Annex A2.3 FCC Part 15 Subpart 15.205 and 15.209		
Prüfergebnis: <i>Test Result</i>	Der vorstehend beschriebene Prüfgegenstand wurde geprüft und entspricht oben genannter Prüfgrundlage. The above product was found to be Compliant to the above test standard(s)		
geprüft / tested by: David Hollis		kontrolliert / reviewed by: Bruce Fagley	
10 August 2009		10 August 2009	
Datum <i>Date</i>	Name <i>Name</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>
Sonstiges : <i>Other Aspects:</i>		None	
Abkürzungen: OK, Pass, Compliant, Complies = entspricht Prüfgrundlage Fail, Not Compliant, Does not Comply = entspricht nicht Prüfgrundlage N/A = nicht anwendbar		Abbreviations: OK, Pass, Compliant, Complies = passed Fail, Not Compliant, Does Not Comply = failed N/A = not applicable	
			
US5112		3466D-1	
		Industry Canada	
		200111-0	

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1 General Information

1.1 Scope

This report is intended to document the status of conformance with the requirements of the FCC Part 15: October 2007, RSS-210: June 2007 based on the results of testing performed on 7/22/09 on the Electronic Article Surveillance Detection System, Model No. Evolve Antenna Family with Accessories, manufactured by Checkpoint Systems Inc.. This report only applies to the specific samples tested under the stated test conditions. It is the responsibility of the manufacturer to assure that additional production units of this model are manufactured with identical or EMI equivalent electrical and mechanical components. This report is further intended to document changes and modifications to the EUT throughout its life cycle. All documentation will be included as a supplement.

1.2 Purpose

Testing was performed to evaluate the EMC performance of the EUT (Equipment Under Test) in accordance with the applicable requirements, procedures, and criteria defined in the application of regulations and application of standards listed in this report.

1.3 Summary of Test Results

Applicant	Checkpoint Systems Inc. 101 Wolf Drive Thorofare, NJ 08086	Tel	(856) 251-2141	Contact	Bayode Olabisi
		Fax	(856) 384-2366	e-mail	bayode.olabisi@checkpt.com
Description	Electronic Article Surveillance Detection System	Model Number	Evolve Antenna Family with Accessories		
Serial Number	See Section 3.5	Test Voltage/Freq.	120V/60Hz		
Test Date Completed:	7/22/09	Test Engineer	David Hollis		
Standards	Description	Severity Level or Limit		Criteria	Test Result
FCC Part 15 Subpart C: October 2007 / RSS-210: June 2007	Intentional Radiators / Low Power Licenced Exempt Radiocommunication Devices	See sections below		See Below	Complies
FCC Part 15 Subpart 15.223/RSS-210 Annex A2.3	Operation in the band 1.705- 10 MHz	100µ V/m @30m		Limit	Complies
FCC Part 15 Subpart 15.207	Conducted limits	Per table in section 207, 150kHz - 30MHz		Limit	Complies
FCC Part 15 Subpart 15.205 and 15.209	Radiated emission limits; general requirements	Class B and per table in section 205 From Fundamental - 1000MHz		Limit	Complies

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2 Laboratory Information

2.1 Accreditations & Endorsements

2.1.1 US Federal Communications Commission

TUV Rheinland of North America located at 12 Commerce Road, Newtown CT is accredited by the commission for performing testing services for the general public on a fee basis. This laboratory test facilities have been fully described in reports submitted to and accepted by the FCC (Registration No US5112). The laboratory scope of accreditation includes: Title 47 CFR Part 15, and 18. The accreditation is updated every 3 years.

2.1.2 NIST / NVLAP

Program, which is administered under the auspices of the National Institute of Standards and Technology. The laboratory has been assessed and accredited in accordance with ISO Standard 17025:2005 (Lab code: 200111-0). The scope of laboratory accreditation includes emission and immunity testing. The accreditation is updated annually.

2.1.3 Industry Canada

Registration No.: 3466D-1. The OATS has been accepted by Industry Canada to perform testing to 3 and to 10m, based on the test procedures described in ANSI C63.4-2003.

2.2 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions measurements is ± 3.2 dB
The estimated combined standard uncertainty for conducted emissions measurements is ± 1.2 dB

2.3 Calibration Traceability

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Measurement method complies with ANSI/NCSL Z540-1-1994 and ISO Standard 17025:2005. Equipment calibration records are kept on file at the test facility.

2.4 Measurement Equipment Used

Equipment	Manufacturer	Model #	Serial/Inst #	Last Cal dd/mm/yy	Next Cal dd/mm/yy	Test
Power Supply	California Instruments	5001iX	HK53766	12/15/08	12/15/09	All
Antenna, Bilog	Sunol Sciences	JB3	A022707	12/12/08	12/12/10	RE
Receiver	Hewlett Packard	HP 8546A, 85460A	3330A00125, 3325A00134	08/28/08	08/28/09	RE, CE
Antenna, Bilog	Schaffner	CBL6112D	22238	05/01/08	05/01/10	RE
LISN	Schwarzbeck	NSLK 8126A (4 x 25A)	8126278	08/20/08	08/20/10	CE
Magnetic Field Loop Antenna	Schwarzbeck	FMZB 1516	151600/94	11/12/08	11/12/10	RE<30MHz

Note: CE = Conducted Emissions, CI= Conducted Immunity, DP=Disturbance Power, EFT=Electrical Fast Transients, ESD = Electrostatic Discharge, FLI=Flicker, HAR=Harmonics, MF=Magnetic Field Immunity, RE=Radiated Emissions, RI=Radiated Immunity, SI=Surge Immunity, VDSI=Voltage Dips and Short Interruptions

3 Product Information

3.1 Equipment Under Test (EUT) Description

The Evolve PAB+SAB Antennas are an Electronic Article Surveillance System (EAS). The system detects target tags attached to merchandise. The targets resonate in the region of 7.2 MHz, 8.2 MHz or 9.2 MHz. When an article of merchandise is purchased, the target is deactivated which causes it to no longer resonate. The Evolve Antennas monitor an area of 3.5 feet on either side of the antenna in the 7.0 to 10.0 MHz range and trigger an alarm when a non-deactivated target is detected.

3.2 General Product Information

The Evolve PAB+SAB family of antennas is used for electronic article surveillance. The Evolve antennas continuously scan at a predetermined frequency and detect anti-pilferage tags which pass through the field generated by the antennas. When a tag is detected the system generates an audible alarm and activates a flashing light on the antenna.

The Evolve PAB+SAB antenna family consists of P10, P20, G10, G20 and S10 models. Four of the five models are floor standing. The P10 and P20 antenna loops are mounted in a hollow plastic frame. The G10 and G20 antenna loops are mounted in a solid Plexiglas frame that is machined to allow the antenna wire to pass through the frame at various points. Both P and G series have three separate loop antenna configurations per gate. The S-10 is different than other models, given that it is mounted on the doorframe in installations, unlike the other models that are floor standing. The S-10 also has a remote electronics chassis that is powered from a single external power supply. All five antenna models use the same digital electronics and transmitter sections. The primary differences between the models are frame material and frame size.

Wherever the models listed in this report are referred to as “Tanzanite”, the model name should be “Evolve”.

3.3 EUT Modes of Operation

The equipment under test was operated during the measurement under the following conditions:

- Continuous sweep mode at 7.2/8.2 Band
- Continuous sweep mode at 8.2 Band
- Continuous sweep mode at 9.0 Dual Band

3.4 EUT Test Configurations

The models listed below were configured as follows for final testing:

P10: 7.2/8.2 band, transmit power = 31
8.2 band, transmit power = 31
9.0 band, transmit power = 31

P20: 8.2 band, transmit power = 31
9.0 band, transmit power = 31
7.2/8.2 band, transmit power = 31

G10: 8.2 band, transmit power = 27
9.0 band, transmit power = 27

G20: 8.2 band, transmit power = 27
9.0 band, transmit power = 27

S10: 8.2 band, transmit power = 31

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3.5 EUT Serial Numbers

P10 PAB: 741163904D12318019
SAB: 741163904D12318020

P20 PAB: 717272707D11529002
SAB: 717272707D11529008

G10 PAB: 741085900U00248001
SAB: 741085900U03247013

G20 PAB: 7283991C0U03027012
SAB: 7283991C0U03027002

S10 724949200D11728070

3.6 Electrical Support Equipment

None

3.7 EUT Equipment/Cabling Information

Antenna	Cable description	Ceonected to	Port	Cable length	
				Length	Shielded
P10/P20/G10/G20/S10	Pedestal main pwr AC	TR4210	J18 / J31	3.05 m	Yes
P10/P20/G10/G20/S10	Ext. dc power supply	TR4210	N/A	3.96 m	Yes
P10/P20	Interpedestal LED Lights/sounder (5594 type)	TR4210	J54/J41	3.96 m	Yes
G10/G20	Interpedestal LED Lights/sounder (Cat 5)	TR4210 & dc pwr pcb	J54/J41 & 24 vdc/gnd	3.96 m	No
P10/P20/G10/G20	Interpedestal RG-59 RF coax cable	Coupler pcb	J5	3.96 m	Yes
S10	RG-59 RF coax cable	Coax adapter pcb	J1/J2	9.14 m	Yes
S10	Cat-5 LED Lights/sounder/Visiplus	TR4210	J42/J11/J72	9.14 m	Yes

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3.8 Modifications

No modifications were required to achieve compliance with the standards listed in this test report.

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4 Measurements

4.1 Operation in the band 1.705-10MHz

This test measures the electromagnetic levels of spurious signals generated by the EUT that radiated from the EUT and may affect the performance of other nearby electronic equipment.

4.1.1 Over View of Test

Results	Complies (as tested per this report)				Date	7/20/09	
Standard	FCC Part 15 Subpart 15.223/RSS-210 Annex A2.3						
Product Model	Evolve Antenna Family with Accessories			Serial#	See Section 3.5		
Configuration	See test plan for details						
Test Set-up	Tested on a 10m O.A.T.S. placed on turn-table, see test plans for details						
EUT Powered By	120V/60Hz	Temp	22°C	Humidity	45%	Pressure	1000mbar
Emissions Limits	100µV @ 30m (see Note)						
Perf. Criteria	Below Limit			Perf. Verification	Readings Under Limit		
Mod. to EUT	None			Test Performed By	David Hollis		

Note: The limits were adjusted in dBµV for a 10m testing resulting in a peak limit of 80dBµV/m. Measurements have been made in all three orthogonal axes of loop antenna and the EUT was rotated to locate the maximum emissions.

4.1.2 Test Procedure

The emissions tests on the fundamental signal were performed using the procedures of ANSI C63.4 including methods for signal maximizations and EUT configuration. The photos included with the report show the EUT in its maximized configuration.

The frequency range from 1.705 – 10MHz was investigated for this test using a magnetic field loop antenna.

4.1.3 Deviations

Measurement of the fundamental emissions – 1.705 to 10.0 MHz – was performed by setting a spectrum analyzer to “max-hold”, peak detector, 300 kHz bandwidth and a span from 7.0 MHz to 10 MHz. A resolution bandwidth of 300 kHz was used in performing the “true peak” measurements because increasing the bandwidth above 300 kHz did not increase the detected peak of the fundamental.

4.1.4 Final Test

All final radiated emissions measurements were below (in compliance with) the limits.

4.1.5 Final Measurement Data

P-20 8.2 Band TX=31:

Radiated Emissions Measurements										
Standard: 47 CFR FCC Part 15.223			PRESCAN or FINAL: Final							Date: 7/15/2009
Device Tested: Evolve P20 PAB + SAB			Distance: 10m					File Name:		
Mode: 8.2 Band TX=31										
Modifications: Tested with modem, visiplus and wired voice alarm present										
Meas #	Freq (MHz)	Measured Peak (dBµV/m)	Peak Limit	Peak Margin	Final Average (dBµV/m)	Average Limit	Average Margin	Result	Orientation (X,Y,Z)	Comment
RBW = 300kHz VBW=300kHz (FCC Settings)										
1	8.065	76.73	80.00	-3.27	41.22	60.00	-18.78	Complied	X Orientation	
2	8.44	77.88	80.00	-2.12	42.69	60.00	-17.31	Complied	X Orientation	
3	8.065	77.03	80.00	-2.97	42.44	60.00	-17.56	Complied	Y Orientation	
4	8.44	78.93	80.00	-1.07	43.92	60.00	-16.08	Complied	Y Orientation	
5	8.065	58.53	80.00	-21.47	30.47	60.00	-29.53	Complied	Z Orientation	
6	8.44	59.5	80.00	-20.50	30.66	60.00	-29.34	Complied	Z Orientation	
Tested by: David Hollis										
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009										
Peak Limit = Average Limit + 20dB = 60dBµV/m + 20dB = 80dBµV/m										
Average limit = 100µV/m @ 30m										
Average Limit = 20*log(100µV) = 40dBµV/m @ 30m										
For 10m measurement the average limit was adjusted = 40log(10/30) = 20dB										
Average limit = 60dBµV/m @ 10m										

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P-20 9.0 Band TX=31:

Radiated Emissions Measurements											
Standard:		47 CFR FCC Part 15.223				PRESCAN or FINAL:		Final		Date: 7/15/2009	
Device Tested:		Evolve P20 PAB + SAB				Distance:		10m		File Name:	
Mode:		9.0 Band TX=31									
Modifications:											
Meas #	Freq (MHz)	Measured Peak (dBµV/m)	Peak Limit	Peak Margin	Final Average (dBµV/m)	Average Limit	Average Margin	Result	Orientation (X,Y,Z)	Comment	
RBW = 300kHz VBW=300kHz (FCC Settings)											
1	8.043	75.15	80.00	-4.85	40.98	60.00	-19.02	Complied	X Orientation		
2	8.33	77.78	80.00	-2.22	42.56	60.00	-17.44	Complied	X Orientation		
3	9.059	76.77	80.00	-3.23	41.83	60.00	-18.17	Complied	X Orientation		
4	8.043	77.37	80.00	-2.63	42.41	60.00	-17.59	Complied	Y Orientation		
5	8.33	79.14	80.00	-0.86	44.27	60.00	-15.73	Complied	Y Orientation		
6	9.059	78.13	80.00	-1.87	43.86	60.00	-16.14	Complied	Y Orientation		
7	8.043	57.61	80.00	-22.39	31.23	60.00	-28.77	Complied	Z Orientation		
8	8.33	59.22	80.00	-20.78	33.54	60.00	-26.46	Complied	Z Orientation		
9	9.059	58.14	80.00	-21.86	32.14	60.00	-27.86	Complied	Z Orientation		
Tested by: David Hollis											
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009											
Peak Limit = Average Limit + 20dB = 60dBµV/m + 20dB = 80dBµV/m											
Average limit = 100µV/m @ 30m											
Average Limit = 20*log(100µV) = 40dBµV/m @ 30m											
For 10m measurement the average limit was adjusted = 40log(10/30) = 20dB											
Average limit = 60dBµV/m@10m											

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P-20 9.0 Band TX=31:

Radiated Emissions Measurements											
Standard:		47 CFR FCC Part 15.223			PRESCAN or FINAL:		Final		Date:		7/16/2009
Device Tested:		Evolve P20 PAB + SAB			Distance:		10m		File Name:		
Mode:		7.2/8.2 Band TX=31									
Modifications:											
Meas #	Freq (MHz)	Measured Peak (dBµV/m)	Peak Limit	Peak Margin	Final Average (dBµV/m)	Average Limit	Average Margin	Result	Orientation (X,Y,Z)	Comment	
RBW = 300kHz VBW=300kHz (FCC Settings)											
1	7.2	73.95	80.00	-6.05	38.86	60.00	-21.14	Complied	X Orientation		
2	7.59	74.49	80.00	-5.51	39.64	60.00	-20.36	Complied	X Orientation		
3	8.07	76.88	80.00	-3.12	41.74	60.00	-18.26	Complied	X Orientation		
4	8.32	78.57	80.00	-1.43	44.01	60.00	-15.99	Complied	X Orientation		
5	7.2	74.36	80.00	-5.64	39.98	60.00	-20.02	Complied	Y Orientation		
6	7.59	76.24	80.00	-3.76	41.23	60.00	-18.77	Complied	Y Orientation		
7	8.07	78.17	80.00	-1.83	43.98	60.00	-16.02	Complied	Y Orientation		
8	8.32	79.27	80.00	-0.73	44.36	60.00	-15.64	Complied	Y Orientation		
9	7.2	58.6	80.00	-21.40	32.15	60.00	-27.85	Complied	Z Orientation		
10	7.59	64.36	80.00	-15.64	36.65	60.00	-23.35	Complied	Z Orientation		
11	8.07	65.1	80.00	-14.90	36.94	60.00	-23.06	Complied	Z Orientation		
12	8.32	64.56	80.00	-15.44	36.70	60.00	-23.30	Complied	Z Orientation		
Tested by: David Hollis											
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009											
Peak Limit = Average Limit + 20dB = 60dBµV/m + 20dB = 80dBµV/m											
Average limit = 100µV/m @ 30m											
Average Limit = 20*log(100µV) = 40dBµV/m @ 30m											
For 10m measurement the average limit was adjusted = 40log(10/30) = 20dB											
Average limit = 60dBµV/m @ 10m											

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P-10 8.2 Band TX=31:

Radiated Emissions Measurements										
Standard:	47 CFR FCC Part 15.223				PRESCAN or FINAL:		Final	Date:		6/18/2009
Device Tested:	Evolve P10 PAB + SAB				Distance:		10m	File Name:		
Mode:	8.2 Band TX=31									
Modifications:										
Meas #	Freq (MHz)	Measured Peak (dBμV/m)	Peak Limit	Peak Margin	Final Average (dBμV/m)	Average Limit	Average Margin	Result	Orientation (X,Y,Z)	Comment
RBW = 300kHz VBW=300kHz (FCC Settings)										
1	8.073	73.75	80.00	-6.25	41.23	60.00	-18.77	Complied	X Orientation	
2	8.32	73.54	80.00	-6.46	40.97	60.00	-19.03	Complied	X Orientation	
3	8.073	74.7	80.00	-5.30	41.28	60.00	-18.72	Complied	Y Orientation	
4	8.32	74.23	80.00	-5.77	41.87	60.00	-18.13	Complied	Y Orientation	
5	8.073	58.17	80.00	-21.83	32.65	60.00	-27.35	Complied	Z Orientation	
6	8.32	57.51	80.00	-22.49	31.21	60.00	-28.79	Complied	Z Orientation	
Tested by: David Hollis										
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009										
Peak Limit = Average Limit + 20dB = 60dBμV/m + 20dB = 80dBμV/m										
Average limit = 100μV/m @ 30m										
Average Limit = 20*log(100μV) = 40dBμV/m @ 30m										
For 10m measurement the average limit was adjusted = 40log(10/30) = 20dB										

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P-10 9.0 Band TX=31:

Radiated Emissions Measurements										
Standard:		47 CFR FCC Part 15.223			PRESCAN or FINAL:		Final		Date: 6/18/2009	
Device Tested:		Evolve P10 PAB + SAB			Distance:		10m		File Name:	
Mode:		9.0 Band TX=31								
Modifications:										
Meas #	Freq (MHz)	Measured Peak (dBµV/m)	Peak Limit	Peak Margin	Final Average (dBµV/m)	Average Limit	Average Margin	Result	Orientation (X,Y,Z)	Comment
RBW = 300kHz VBW=300kHz (FCC Settings)										
1	9.093	70.64	80.00	-9.36	39.78	60.00	-20.22	Complied	X Orientation	
2	9.333	71.1	80.00	-8.90	40.22	60.00	-19.78	Complied	X Orientation	
3	9.093	73.32	80.00	-6.68	41.11	60.00	-18.89	Complied	Y Orientation	
4	9.333	74.15	80.00	-5.85	41.98	60.00	-18.02	Complied	Y Orientation	
5	9.093	56.59	80.00	-23.41	30.21	60.00	-29.79	Complied	Z Orientation	
6	9.333	57.29	80.00	-22.71	31.17	60.00	-28.83	Complied	Z Orientation	
Tested by:		David Hollis								
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009										
		Peak Limit = Average Limit + 20dB = 60dBµV/m + 20dB = 80dBµV/m								
		Average limit = 100µV/m @ 30m								
		Average Limit = 20*log(100µV) = 40dBµV/m @ 30m								
		For 10m measurement the average limit was adjusted = 40log(10/30) = 20dB								
		Average limit = 60dBµV/m @ 10m								

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P-10 7.2/8.2 Band TX=31:

Radiated Emissions Measurements											
Standard:		47 CFR FCC Part 15.223			PRESCAN or FINAL:		Final		Date:		7/17/2009
Device Tested:		Evolve P10 PAB + SAB			Distance:		10m		File Name:		
Mode:		7.2/8.2 Band TX=31									
Modifications:											
Meas #	Freq (MHz)	Measured Peak (dBµV/m)	Peak Limit	Peak Margin	Final Average (dBµV/m)	Average Limit	Average Margin	Result	Orientation (X,Y,Z)	Comment	
RBW = 300kHz VBW=300kHz (FCC Settings)											
1	7.2	75.22	80.00	-4.78	40.91	60.00	-19.09	Complied	X Orientation		
2	7.57	75.54	80.00	-4.46	41.24	60.00	-18.76	Complied	X Orientation		
3	8.06	76.43	80.00	-3.57	41.74	60.00	-18.26	Complied	X Orientation		
4	8.34	76.9	80.00	-3.10	42.05	60.00	-17.95	Complied	X Orientation		
5	7.2	74.86	80.00	-5.14	40.22	60.00	-19.78	Complied	Y Orientation		
6	7.57	77.67	80.00	-2.33	41.74	60.00	-18.26	Complied	Y Orientation		
7	8.06	78.13	80.00	-1.87	43.85	60.00	-16.15	Complied	Y Orientation		
8	8.34	78.29	80.00	-1.71	44.16	60.00	-15.84	Complied	Y Orientation		
9	7.2	68.08	80.00	-11.92	36.08	60.00	-23.92	Complied	Z Orientation		
10	7.57	66.82	80.00	-13.18	36.65	60.00	-23.35	Complied	Z Orientation		
11	8.06	66.02	80.00	-13.98	35.84	60.00	-24.16	Complied	Z Orientation		
12	8.34	67.31	80.00	-12.69	39.96	60.00	-20.04	Complied	Z Orientation		
Tested by:		David Hollis									
		TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009									
		Peak Limit = Average Limit + 20dB = 60dBµV/m + 20dB = 80dBµV/m									
		Average limit = 100µV/m @ 30m									
		Average Limit = 20*log(100µV) = 40dBµV/m @ 30m									
		For 10m measurement the average limit was adjusted = 40log(10/30) = 20dB									
		Average limit = 60dBµV/m@10m									

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G-20 8.2 Band TX=27:

Radiated Emissions Measurements										
Standard:	47 CFR FCC Part 15.223				PRESCAN or FINAL:	Final		Date:	7/15/2009	
Device Tested:	Evolve G20 PAB + SAB				Distance:	10m		File Name:		
Mode:	8.2 Band TX=27									
Modifications:										
Meas #	Freq (MHz)	Measured Peak (dBµV/m)	Peak Limit	Peak Margin	Final Average (dBµV/m)	Average Limit	Average Margin	Result	Orientation (X,Y,Z)	Comment
RBW = 300kHz VBW=300kHz (FCC Settings)										
1	7.993	77.6	80.00	-2.40	42.47	60.00	-17.53	Complied	X Orientation	
2	8.427	77.52	80.00	-2.48	42.38	60.00	-17.62	Complied	X Orientation	
3	8.065	78.25	80.00	-1.75	43.21	60.00	-16.79	Complied	Y Orientation	
4	8.455	78.97	80.00	-1.03	43.39	60.00	-16.61	Complied	Y Orientation	
5	8.065	60.07	80.00	-19.93	33.63	60.00	-26.37	Complied	Z Orientation	
6	8.455	61.1	80.00	-18.90	34.19	60.00	-25.81	Complied	Z Orientation	
Tested by: David Hollis										
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009										
Peak Limit = Average Limit + 20dB = 60dBµV/m + 20dB = 80dBµV/m										
Average limit = 100µV/m @ 30m										
Average Limit = 20*log(100µV) = 40dBµV/m @ 30m										
For 10m measurement the average limit was adjusted = 40log(10/30) = 20dB										
Average limit = 60dBµV/m @ 10m										

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G-20 9.0 Band TX=27:

Radiated Emissions Measurements										
Standard:		47 CFR FCC Part 15.223			PRESCAN or FINAL:		Final		Date: 7/15/2009	
Device Tested:		Evolve G20 PAB + SAB			Distance:		10m		File Name:	
Mode:		9.0 Band TX=27								
Modifications:										
Meas #	Freq (MHz)	Measured Peak (dBµV/m)	Peak Limit	Peak Margin	Final Average (dBµV/m)	Average Limit	Average Margin	Result	Orientation (X,Y,Z)	Comment
RBW = 300kHz VBW=300kHz (FCC Settings)										
1	8.057	79.52	80.00	-0.48	44.64	60.00	-15.36	Complied	X Orientation	
2	8.33	79.25	80.00	-0.75	44.14	60.00	-15.86	Complied	X Orientation	
3	9.071	77.35	80.00	-2.65	42.39	60.00	-17.61	Complied	X Orientation	
4	9.324	76.92	80.00	-3.08	42.06	60.00	-17.94	Complied	X Orientation	
5	8.057	78.85	80.00	-1.15	43.98	60.00	-16.02	Complied	Y Orientation	
6	8.33	79.06	80.00	-0.94	44.12	60.00	-15.88	Complied	Y Orientation	
7	9.071	79.34	80.00	-0.66	44.25	60.00	-15.75	Complied	Y Orientation	
8	9.324	79.45	80.00	-0.55	44.36	60.00	-15.64	Complied	Y Orientation	
9	8.057	60.97	80.00	-19.03	33.65	60.00	-26.35	Complied	Z Orientation	
10	8.33	62.94	80.00	-17.06	34.89	60.00	-25.11	Complied	Z Orientation	
11	9.071	60.71	80.00	-19.29	33.04	60.00	-26.96	Complied	Z Orientation	
12	9.324	60.62	80.00	-19.38	33.25	60.00	-26.75	Complied	Z Orientation	
Tested by: David Hollis										
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009										
Peak Limit = Average Limit + 20dB = 60dBµV/m + 20dB = 80dBµV/m										
Average limit = 100µV/m @ 30m										
Average Limit = 20*log(100µV) = 40dBµV/m @ 30m										
For 10m measurement the average limit was adjusted = 40log(10/30) = 20dB										
Average limit = 60dBµV/m@10m										

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G-10 8.2 Band TX=27:

Radiated Emissions Measurements											
Standard:		47 CFR FCC Part 15.223			PRESCAN or FINAL:		Final		Date:		6/18/2009
Device Tested:		Evolve G10 PAB + SAB			Distance:		10m		File Name:		
Mode:		8.2 Band TX=27									
Modifications:											
Meas #	Freq (MHz)	Measured Peak (dBµV/m)	Peak Limit	Peak Margin	Final Average (dBµV/m)	Average Limit	Average Margin	Result	Orientation (X,Y,Z)	Comment	
RBW = 300kHz VBW=300kHz (FCC Settings)											
1	7.93	70.64	80.00	-9.36	39.86	60.00	-20.14	Complied	X Orientation		
2	8.35	67.98	80.00	-12.02	36.54	60.00	-23.46	Complied	X Orientation		
3	7.93	79.31	80.00	-0.69	44.16	60.00	-15.84	Complied	Y Orientation		
4	8.25	79.8	80.00	-0.20	44.58	60.00	-15.42	Complied	Y Orientation		
5	7.93	64.1	80.00	-15.90	35.21	60.00	-24.79	Complied	Z Orientation		
6	8.41	65.13	80.00	-14.87	35.98	60.00	-24.02	Complied	Z Orientation		
Tested by: David Hollis											
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009											
Peak Limit = Average Limit + 20dB = 60dBµV/m + 20dB = 80dBµV/m											
Average limit = 100µV/m @ 30m											
Average Limit = 20*log(100µV) = 40dBµV/m @ 30m											
For 10m measurement the average limit was adjusted = 40log(10/30) = 20dB											
Average limit = 60dBµV/m@10m											

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G-10 9.0 Band TX=27:

Radiated Emissions Measurements											
Standard:		47 CFR FCC Part 15.223				PRESCAN or FINAL:		Final		Date: 6/18/2009	
Device Tested:		Evolve G10 PAB + SAB				Distance:		10m		File Name:	
Mode:		9.0 Band TX=27									
Modifications:											
Meas #	Freq (MHz)	Measured Peak (dBµV/m)	Peak Limit	Peak Margin	Final Average (dBµV/m)	Average Limit	Average Margin	Result	Orientation (X,Y,Z)	Comment	
RBW = 300kHz VBW=300kHz (FCC Settings)											
1	9.078	65.77	80.00	-14.23	38.31	60.00	-21.69	Complied	X Orientation		
2	9.303	66.37	80.00	-13.63	39.22	60.00	-20.78	Complied	X Orientation		
3	9.078	78.91	80.00	-1.09	43.88	60.00	-16.12	Complied	Y Orientation		
4	9.303	79.42	80.00	-0.58	44.58	60.00	-15.42	Complied	Y Orientation		
5	9.078	61.8	80.00	-18.20	33.87	60.00	-26.13	Complied	Z Orientation		
6	9.303	62.56	80.00	-17.44	34.21	60.00	-25.79	Complied	Z Orientation		
Tested by:		David Hollis									
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009											
		Peak Limit = Average Limit + 20dB = 60dBµV/m + 20dB = 80dBµV/m									
		Average limit = 100µV/m @ 30m									
		Average Limit = 20*log(100µV) = 40dBµV/m @ 30m									
		For 10m measurement the average limit was adjusted = 40log(10/30) = 20dB									
		Average limit = 60dBµV/m @ 10m									

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S-10 8.2 Band TX=31:

Radiated Emissions Measurements											
Standard:		47 CFR FCC Part 15.223			PRESCAN or FINAL:		Final		Date:		6/18/2009
Device Tested:		Evolve S10 PAB + SAB			Distance:		10m		File Name:		
Mode:		8.2 Band TX=31									
Modifications:											
Meas #	Freq (MHz)	Measured Peak (dBµV/m)	Peak Limit	Peak Margin	Final Average (dBµV/m)	Average Limit	Average Margin	Result	Orientation (X,Y,Z)	Comment	
RBW = 300kHz VBW=300kHz (FCC Settings)											
1	8.076	70.36	80.00	-9.64	39.88	60.00	-20.12	Complied	X Orientation		
2	8.421	71.5	80.00	-8.50	40.47	60.00	-19.53	Complied	X Orientation		
3	8.076	70.43	80.00	-9.57	39.65	60.00	-20.35	Complied	Y Orientation		
4	8.466	75.52	80.00	-4.48	42.15	60.00	-17.85	Complied	Y Orientation		
5	8.076	59.31	80.00	-20.69	33.13	60.00	-26.87	Complied	Z Orientation		
6	8.421	63.53	80.00	-16.47	34.96	60.00	-25.04	Complied	Z Orientation		
Tested by:		David Hollis									
		TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009									
		Peak Limit = Average Limit + 20dB = 60dBµV/m + 20dB = 80dBµV/m									
		Average limit = 100µV/m @ 30m									
		Average Limit = 20*log(100µV) = 40dBµV/m @ 30m									
		For 10m measurement the average limit was adjusted = 40log(10/30) = 20dB									
		Average limit = 60dBµV/m @ 10m									

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4.1.6 Photos

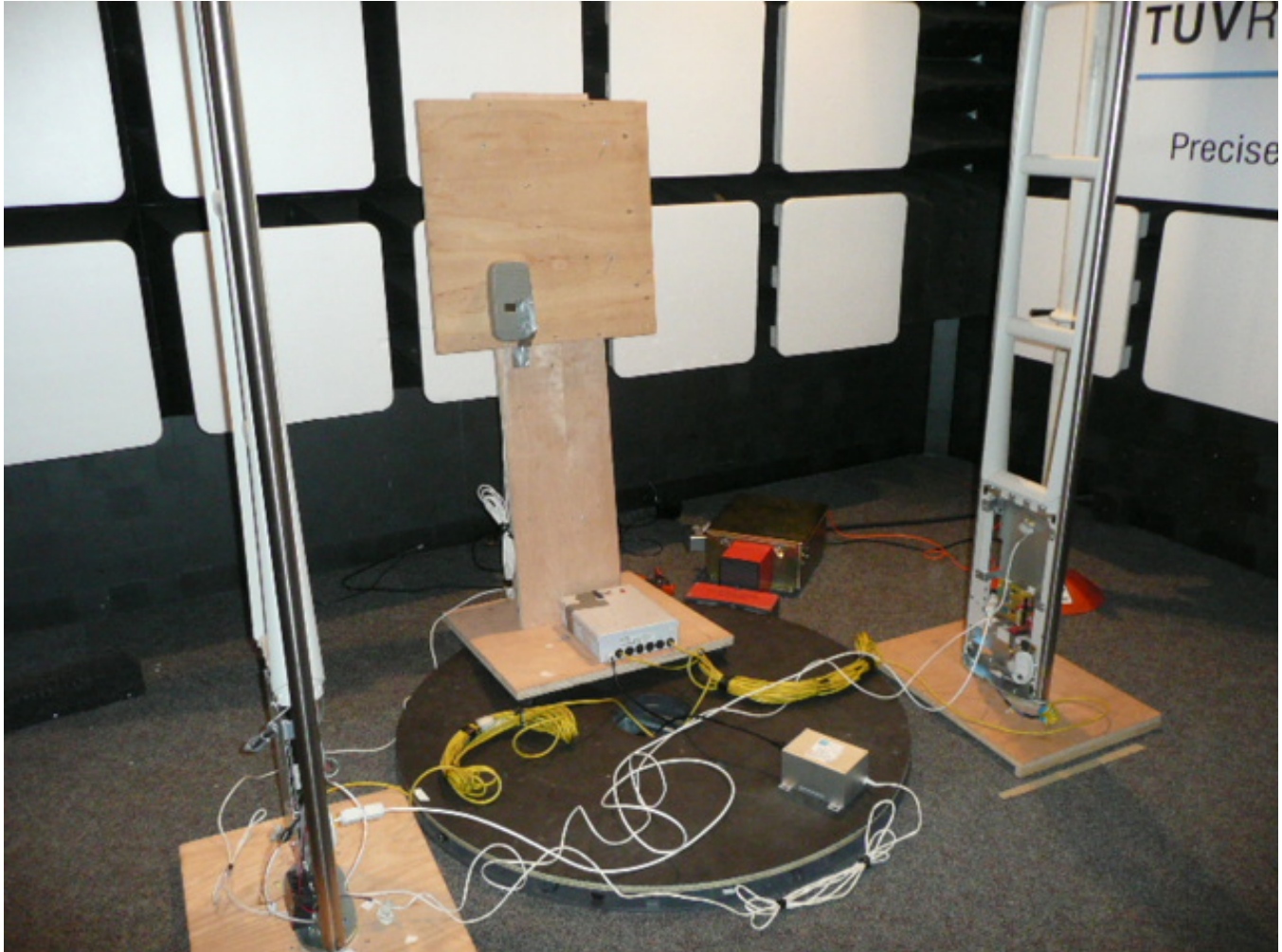


Figure 1 - Radiated Emissions Test Setup (Semi-Anechoic Chamber) – P-20

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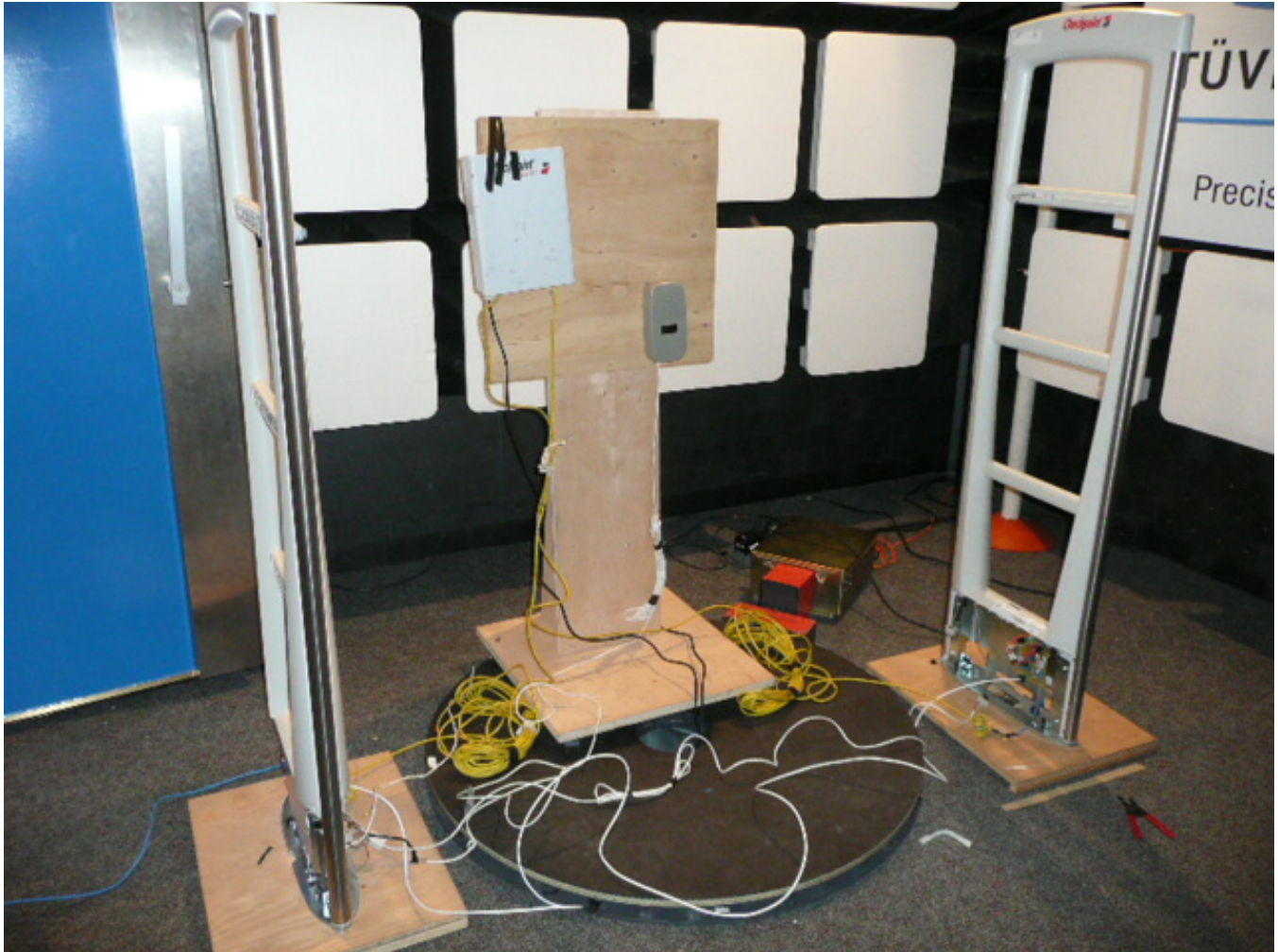


Figure 2 - Radiated Emissions Test Setup (Semi-Anechoic Chamber) – P-10

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TÜV Rheinland test mark. This report must not be used by the applicant to claim product endorsement by TÜV Rheinland, NVLAP or any agency of the United States Government.

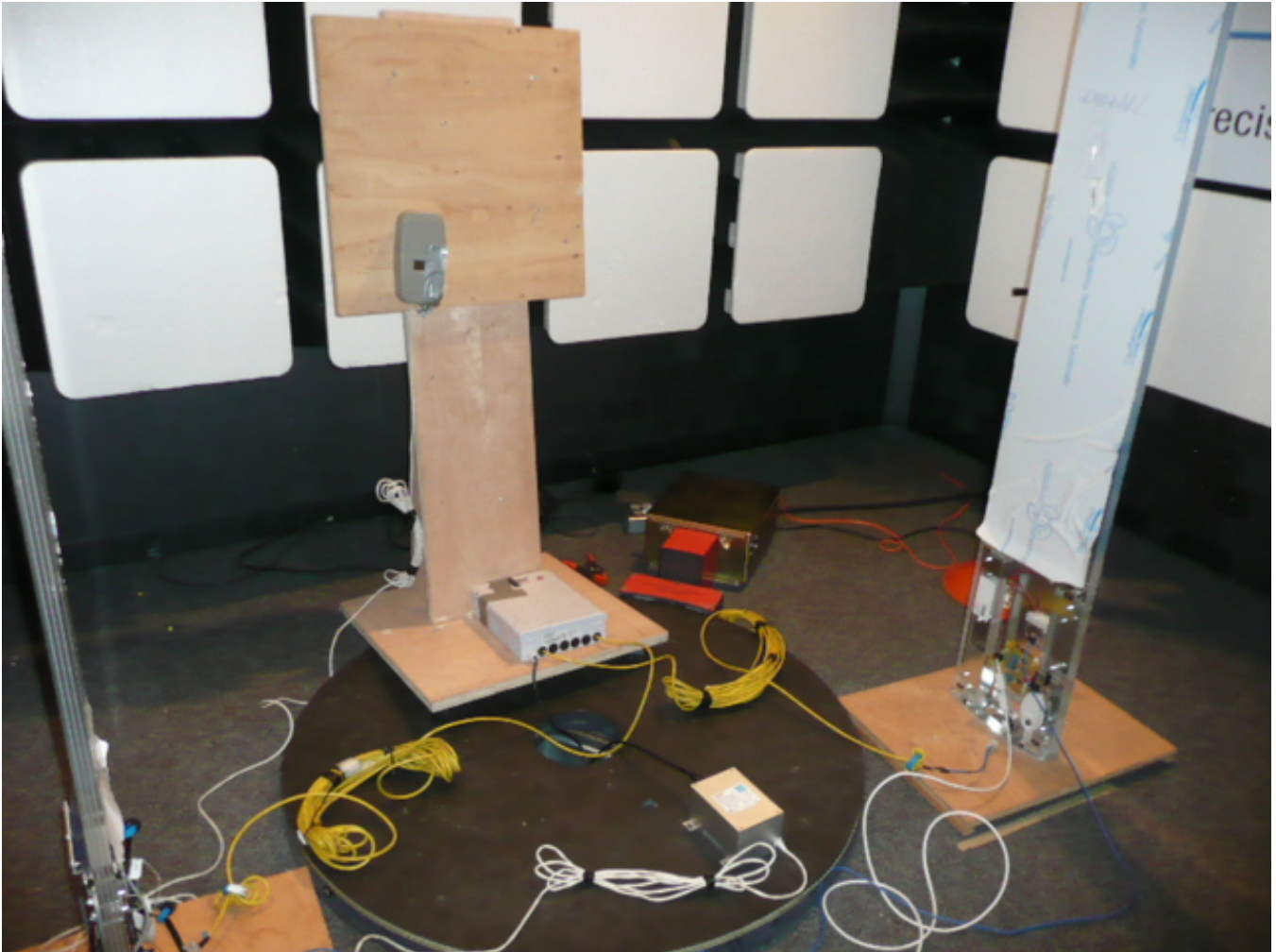


Figure 3 - Radiated Emissions Test Setup (Semi-Anechoic Chamber) – G-20

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TÜV Rheinland test mark. This report must not be used by the applicant to claim product endorsement by TÜV Rheinland, NVLAP or any agency of the United States Government.

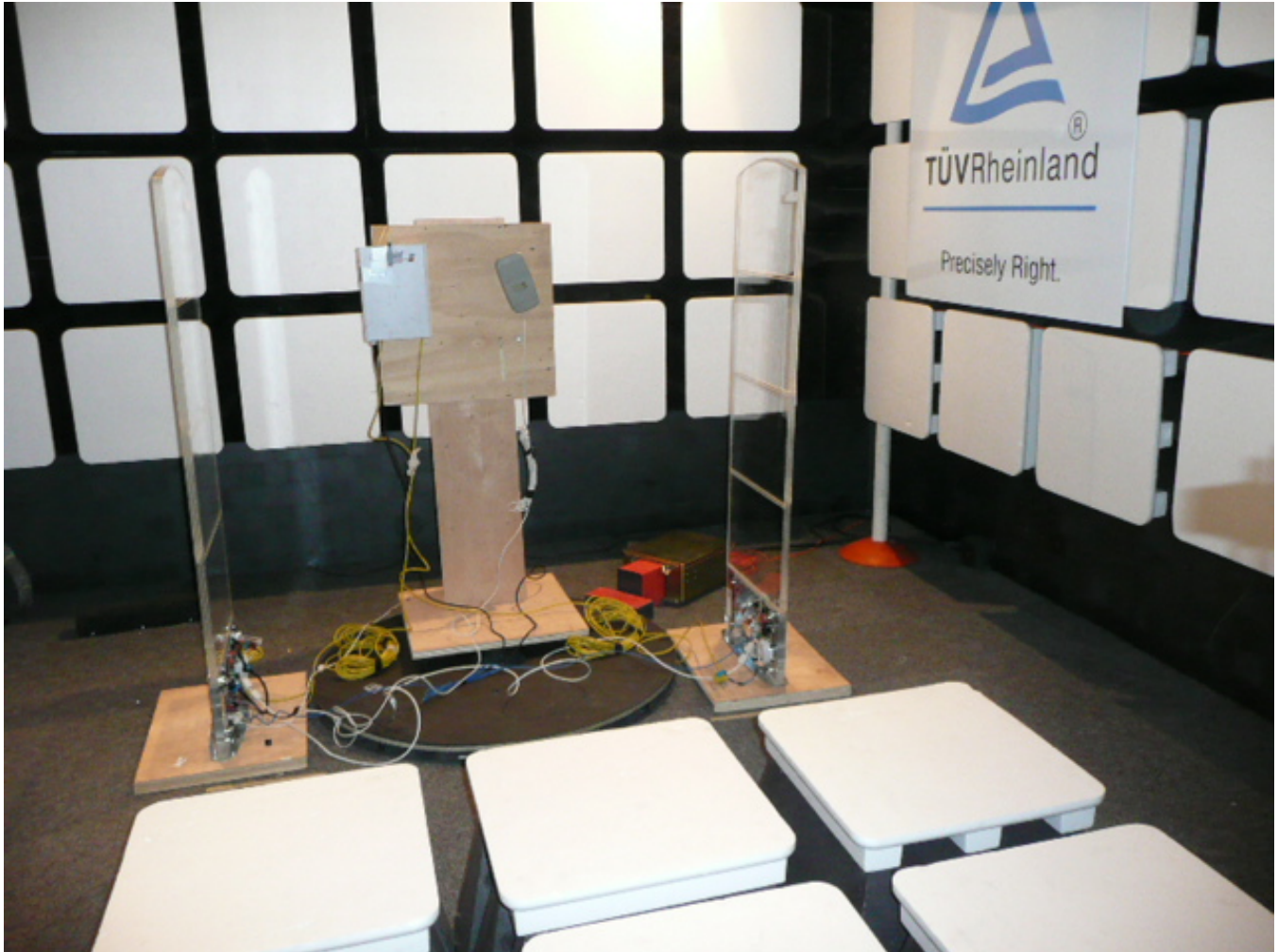


Figure 4 - Radiated Emissions Test Setup (Semi-Anechoic Chamber) – G-10

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TÜV Rheinland test mark. This report must not be used by the applicant to claim product endorsement by TÜV Rheinland, NVLAP or any agency of the United States Government.

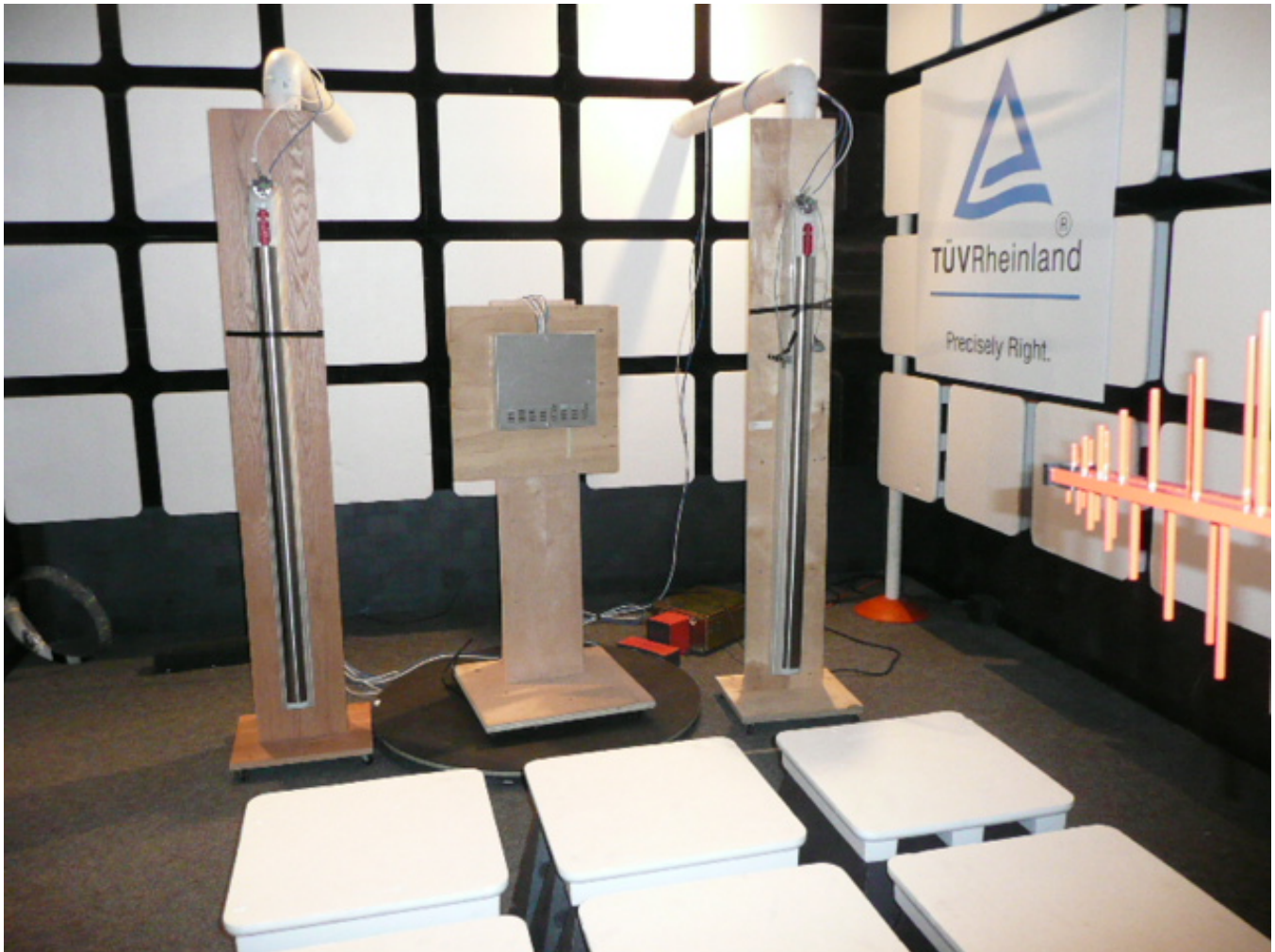


Figure 5 - Radiated Emissions Test Setup (Semi-Anechoic Chamber) – S-10

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TÜV Rheinland test mark. This report must not be used by the applicant to claim product endorsement by TÜV Rheinland, NVLAP or any agency of the United States Government.

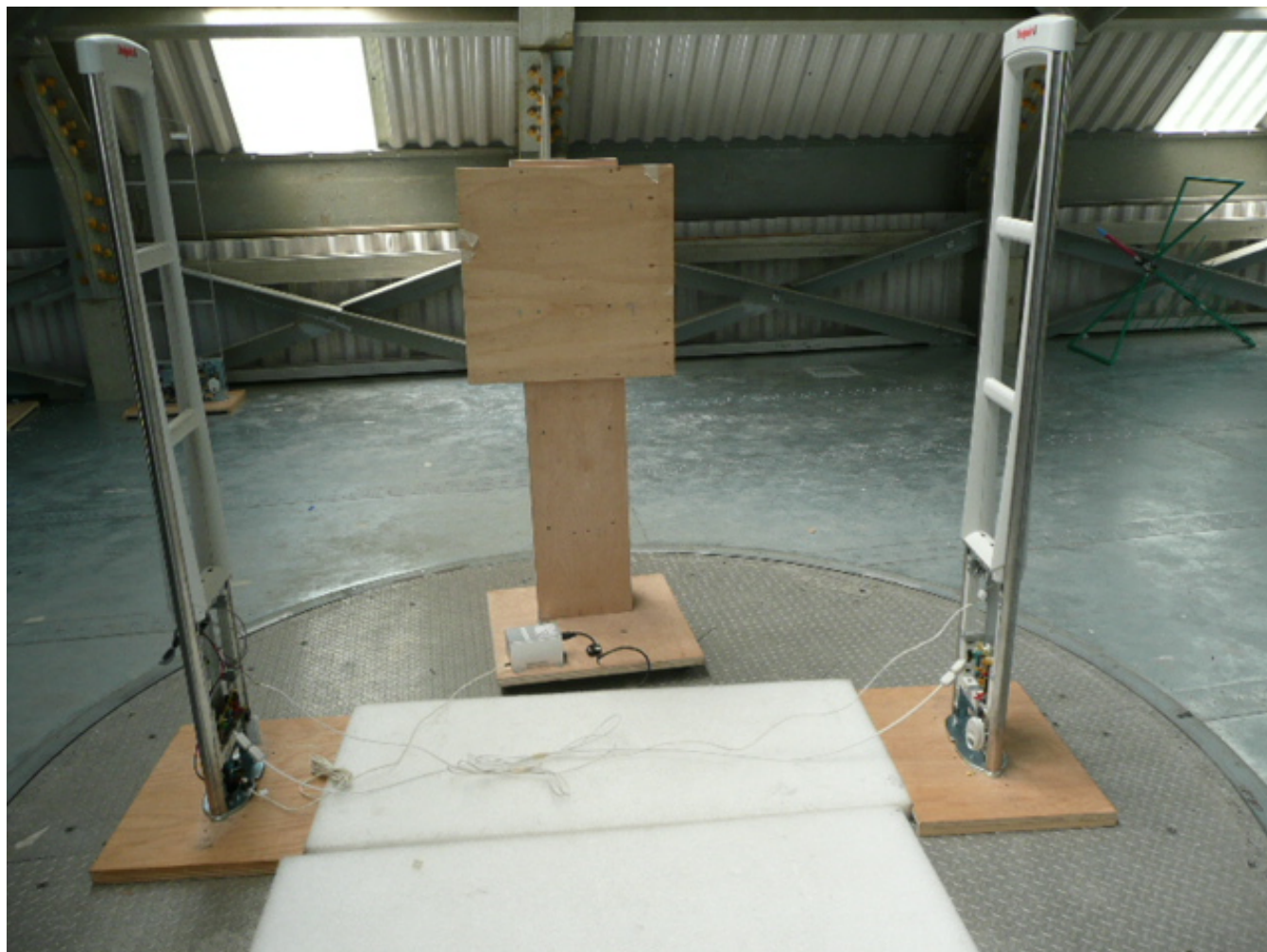


Figure 6 – Radiated Emissions Test Setup – P-20

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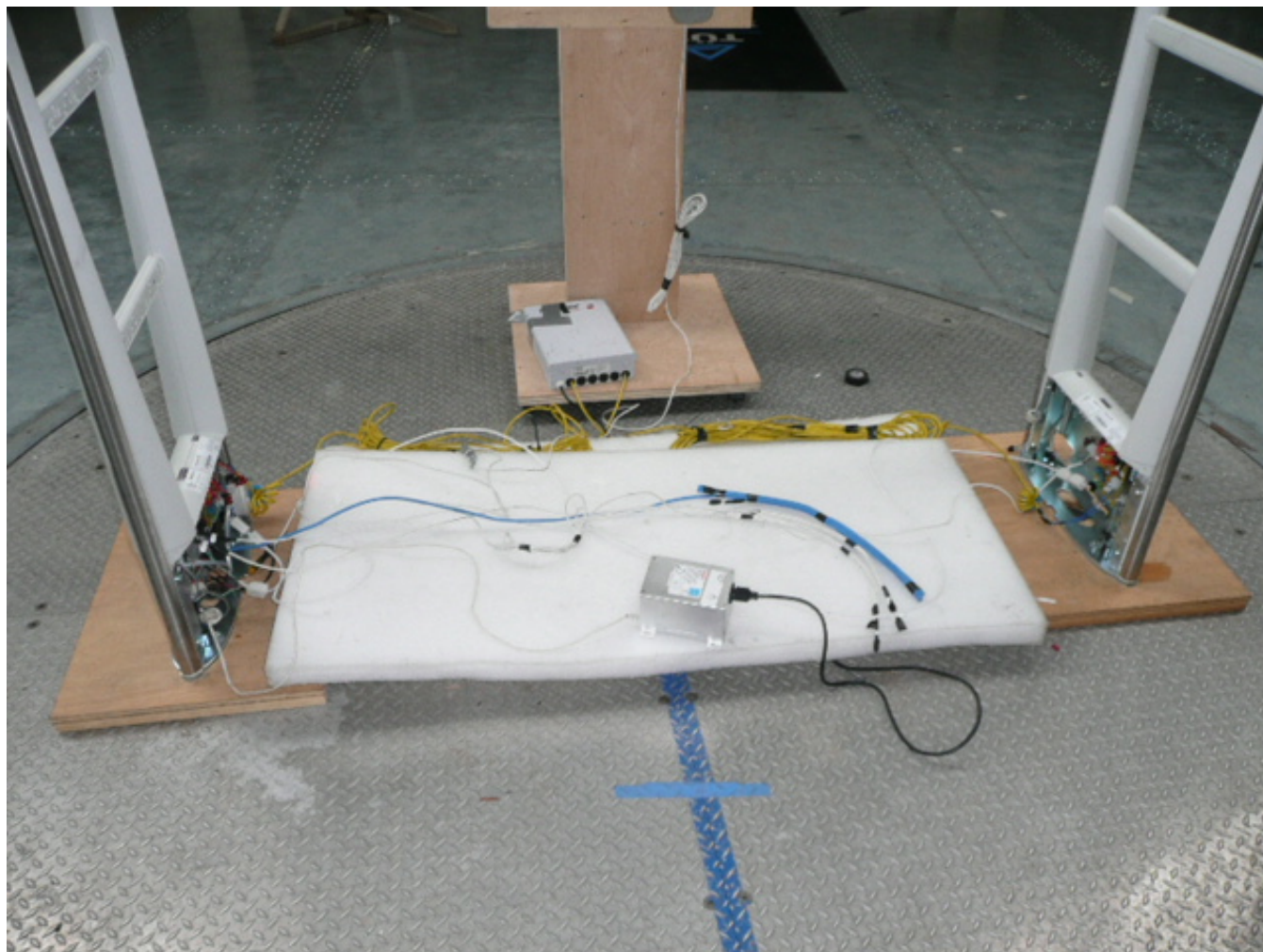


Figure 7 – Radiated Emissions Test Setup – P-10

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TÜV Rheinland test mark. This report must not be used by the applicant to claim product endorsement by TÜV Rheinland, NVLAP or any agency of the United States Government.

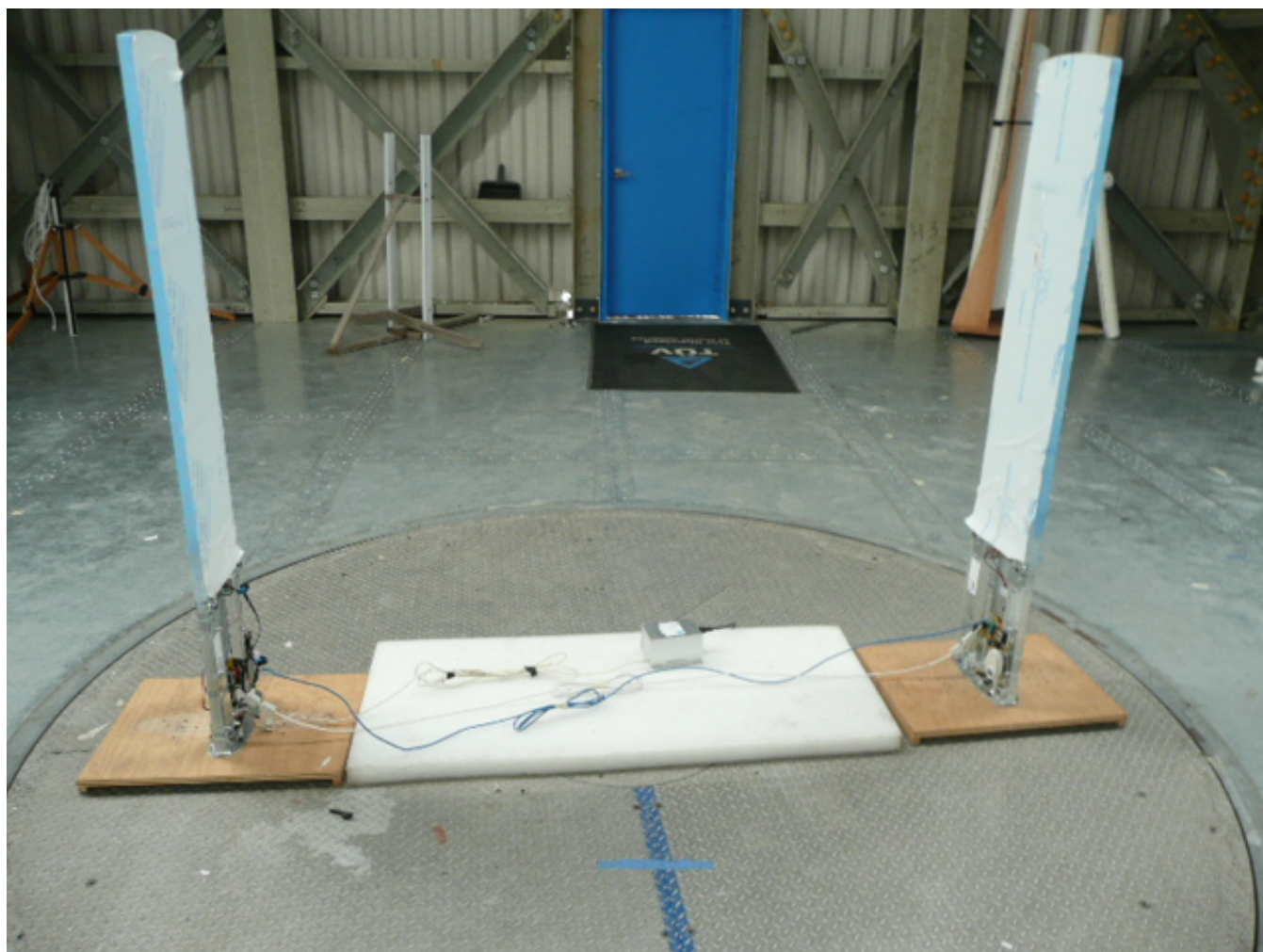


Figure 8 – Radiated Emissions Test Setup – G-20

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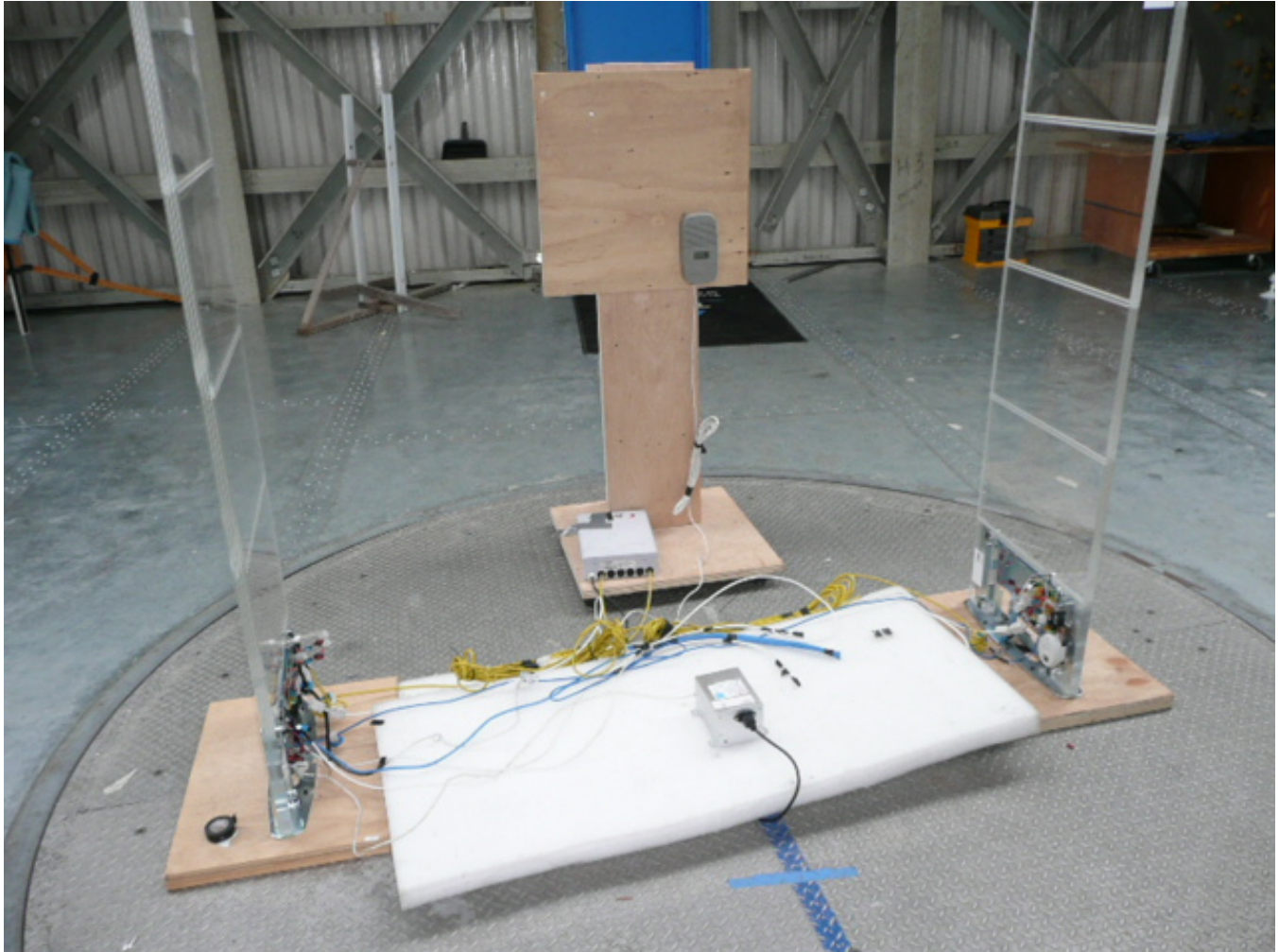


Figure 9 – Radiated Emissions Test Setup – G-10

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TÜV Rheinland test mark. This report must not be used by the applicant to claim product endorsement by TÜV Rheinland, NVLAP or any agency of the United States Government.



Figure 10 – Radiated Emissions Test Setup – S-10

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4.2 Conducted Limits

This test measures the electromagnetic levels of spurious signals generated by the EUT on the AC power line that may affect the performance of other near by electronic equipment.

4.2.1 Over View of Test

Results	Complies (as tested per this report)					Date	07/21/2009	
Standard	FCC Part 15 Subpart 15.223/RSS-210 Annex A2.3							
Product Model	Evolve Antenna Family with Accessories			Serial#	See Section 3.5			
Configuration	See test plan for details							
Test Set-up	Tested in shielded room		EUT placed on table		see test plans for details			
EUT Powered By	120V/60Hz	Temp	22° C	Humidity	45%	Pressure	1000mbar	
Frequency Range	150kHz - 30MHz							
Perf. Criteria	Per table in section 207 (Below Limit)			Perf. Verification	Readings Under Limit for L1 and L2			
Mod. to EUT	None			Test Performed By	David Hollis			

4.2.2 Test Procedure

Conducted and FCC emissions tests were performed using the procedures of ANSI C63.4 including methods for signal maximizations and EUT configuration. The photos included with the report show the EUT in its maximized configuration.

The frequency range from 150kHz - 30MHz was investigated for conducted emissions.

Conducted Emissions measurements were performed in the shielded room using procedures specified in the test plan and standard.

4.2.3 Deviations

There were no deviations from the test methodology listed in the test plan for the conducted emission test.

4.2.4 Final Test


All final conducted emissions measurements were below (in compliance with) the limits.

4.2.5 Final Measurement Data

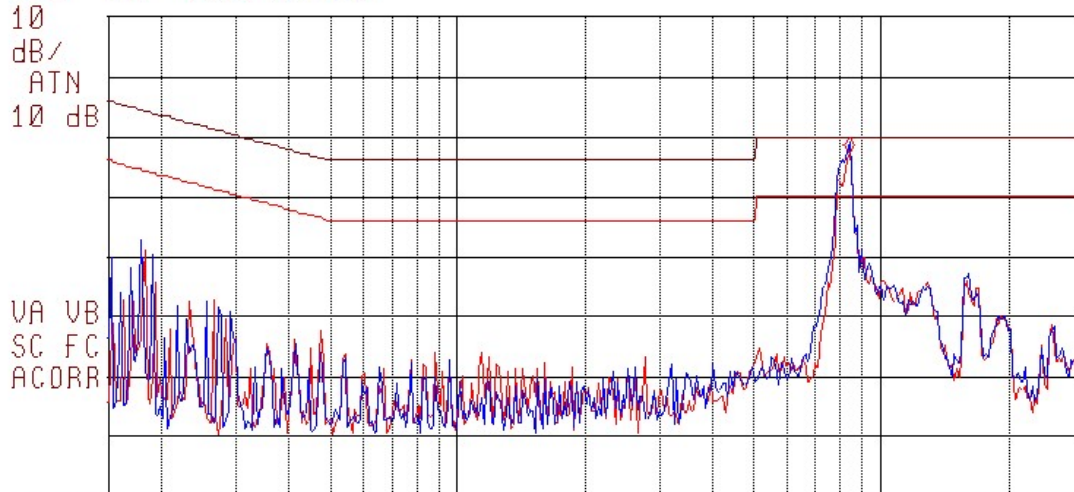
P20 8.2 Band TX=31

NOTES:

Conducted Emissions @ 120V/60Hz
P-20 8.2Tx Band
Line / Neutral

 12:46:08 JUL 21, 2009
TANZANITE P20 8.2 BAND TX=31 120/60
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 6.43 MHz
57.08 dB μ V/m

LOG REF 80.0 dB μ V/m



START 150 kHz STOP 30.00 MHz
L #IF BW 9.0 kHz AVG BW 30 kHz SWP 2.49 sec

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Conducted Emissions Measurements												
Standard: FCC Part 15.207										Date: 7/21/09		
Device Tested: Evolve P20 PAB + SAB 8.2 Band tx=31 120/60										File: .xls		
Signal Num	Freq MHz	Peak Amp dBuV	QP Amp dBuV	Avg Amp dBuV	QP Limit dBuV	Avg Limit dBuV	Conductor	QP Δ dB	QP Result	Avg Δ dB	Average Result	Mode
1	0.1798	41.79	36.55	25.04	64.50	54.50	Line	-27.95	Complied	-29.46	Complied	
2	8.4111	55.00	51.70	37.30	60.00	50.00	Line	-8.30	Complied	-12.70	Complied	
3	12.9249	34.88	32.72	22.23	60.00	50.00	Line	-27.28	Complied	-27.77	Complied	
4	16.1570	37.46	36.01	18.05	60.00	50.00	Line	-23.99	Complied	-31.95	Complied	
5	19.3289	32.30	29.80	20.01	60.00	50.00	Line	-30.20	Complied	-29.99	Complied	
6	25.3129	31.93	28.57	12.93	60.00	50.00	Line	-31.43	Complied	-37.07	Complied	
7	0.1798	44.13	34.89	24.55	64.50	54.50	Neutral	-29.61	Complied	-29.95	Complied	
8	8.4111	56.83	53.52	39.04	60.00	50.00	Neutral	-6.48	Complied	-10.96	Complied	Maximum Emissions
9	12.9249	34.86	32.60	22.13	60.00	50.00	Neutral	-27.40	Complied	-27.87	Complied	
10	16.1570	37.60	36.30	18.59	60.00	50.00	Neutral	-23.70	Complied	-31.41	Complied	
11	19.3289	33.06	30.39	20.34	60.00	50.00	Neutral	-29.61	Complied	-29.66	Complied	
12	25.3129	32.63	29.17	13.46	60.00	50.00	Neutral	-30.83	Complied	-36.54	Complied	
Tested by: David Hollis												
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009												


CE22_B.xls Revised 21OCT2005

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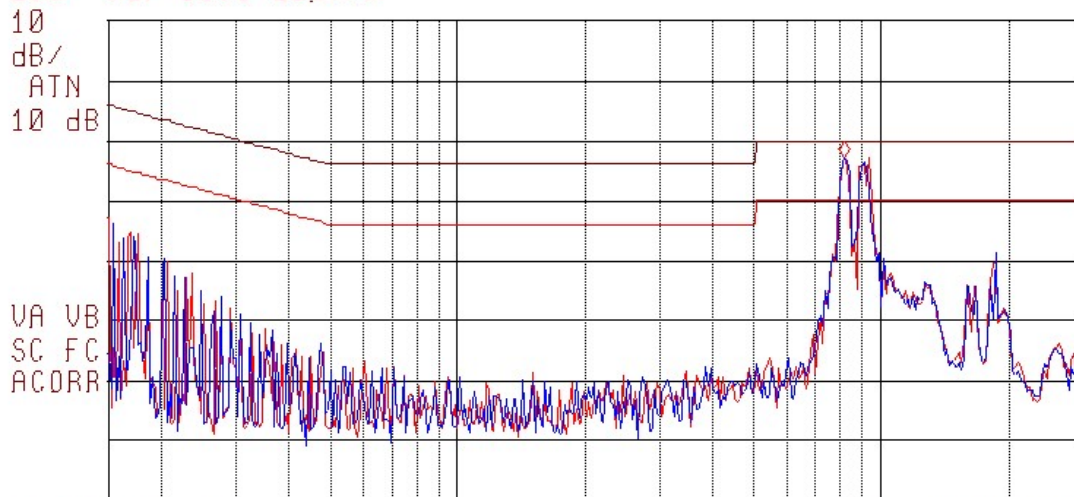
P20 9.0 Band TX=31

NOTES:

Conducted Emissions @ 120V/60Hz
P-20 9.0 Tx Band
Line / Neutral

 09:55:25 JUL 21, 2009
TANZANITE P20 9.0 BAND TX=31 120/60
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 6.18 MHz
57.04 dB μ V/m

LOG REF 60.0 dB μ V/m



START 150 kHz STOP 30.00 MHz
#IF BW 9.0 kHz AVG BW 30 kHz SWP 2.49 sec

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Conducted Emissions Measurements												
Standard: FCC Part 15.207										Date: 7/21/09		
Device Tested: Evolve P20 PAB + SAB 9.0 Band tx=31 120/60										File: .xls		
Signal Num	Freq MHz	Peak Amp dBuV	QP Amp dBuV	Avg Amp dBuV	QP Limit dBuV	Avg Limit dBuV	Conductor	QP Δ dB	QP Result	Avg Δ dB	Average Result	Mode
1	0.1795	43.47	35.45	23.51	64.51	54.51	Line	-29.06	Complied	-31.00	Complied	
2	8.0626	56.29	55.21	35.51	60.00	50.00	Line	-4.79	Complied	-14.49	Complied	
3	9.0316	56.77	55.73	37.45	60.00	50.00	Line	-4.27	Complied	-12.55	Complied	Maximum Emissions
4	12.9193	35.42	33.02	21.96	60.00	50.00	Line	-26.98	Complied	-28.04	Complied	
5	16.1838	34.45	31.32	15.88	60.00	50.00	Line	-28.68	Complied	-34.12	Complied	
6	18.6564	43.13	41.90	24.86	60.00	50.00	Line	-18.10	Complied	-25.14	Complied	
7	25.7866	24.00	19.31	9.13	60.00	50.00	Line	-40.69	Complied	-40.87	Complied	
8	0.1795	44.59	36.17	23.80	64.51	54.51	Neutral	-28.34	Complied	-30.71	Complied	
9	8.0626	53.86	52.77	33.37	60.00	50.00	Neutral	-7.23	Complied	-16.63	Complied	
10	9.0316	56.34	55.32	36.97	60.00	50.00	Neutral	-4.68	Complied	-13.03	Complied	
11	12.9193	34.90	32.99	21.91	60.00	50.00	Neutral	-27.01	Complied	-28.09	Complied	
12	16.1838	33.68	30.98	15.22	60.00	50.00	Neutral	-29.02	Complied	-34.78	Complied	
13	18.6564	42.87	41.60	24.21	60.00	50.00	Neutral	-18.40	Complied	-25.79	Complied	
14	25.7866	24.89	17.27	8.25	60.00	50.00	Neutral	-42.73	Complied	-41.75	Complied	
Tested by: David Hollis												
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009												
CE22_B.xls Revised 21OCT2005												

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P10 8.2 Band TX=31

NOTES:

Conducted Emissions @ 120V/60Hz
P-10 8.2Tx Band
Line / Neutral

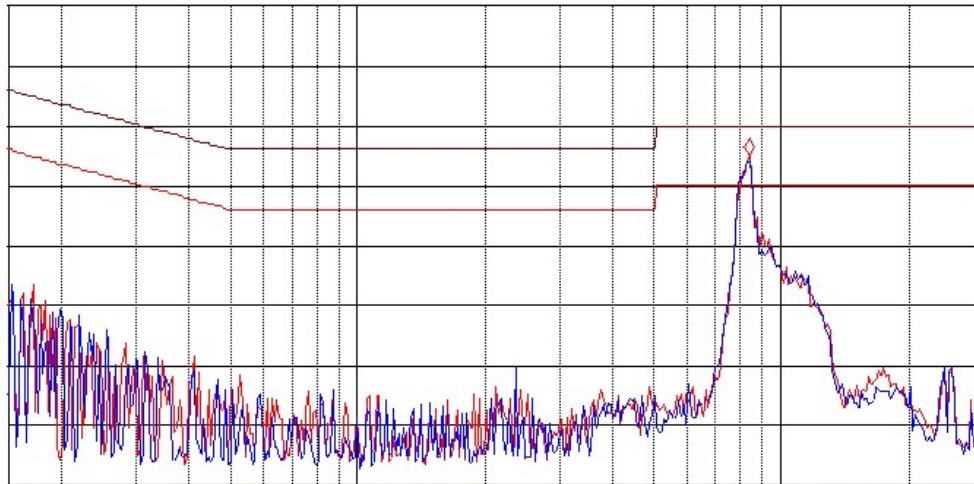
 15:48:55 JUL 24, 2009
TANZANITE P10 8.2 BAND 120/60

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 6.43 MHz
55.10 dB μ V/m

LOG REF 60.0 dB μ V/m

10
dB/
ATN
10 dB

VA VB
SC FC
ACDRR



START 150 kHz STOP 30.00 MHz
#IF BW 9.0 kHz AVG BW 30 kHz SWP 2.49 sec

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Conducted Emissions Measurements												
Standard: FCC Part 15.207											Date: 7/24/09	
Device Tested: Evolve P10 PAB + SAB 8.2 band tx=31 120/60											File: .xls	
Signal Num	Freq MHz	Peak Amp dBuV	QP Amp dBuV	Avg Amp dBuV	QP Limit dBuV	Avg Limit dBuV	Conductor	QP Δ dB	QP Result	Avg Δ dB	Average Result	Mode
1	0.1777	34.93	26.92	12.03	64.59	54.59	Line	-37.67	Complied	-42.56	Complied	
2	2.3664	20.72	18.65	11.12	60.00	46.00	Line	-37.35	Complied	-34.88	Complied	
3	8.4692	57.12	53.29	40.31	60.00	50.00	Line	-6.71	Complied	-9.69	Complied	Maximum Emissions
4	11.3757	31.99	27.85	18.04	60.00	50.00	Line	-32.15	Complied	-31.96	Complied	
5	17.2852	16.14	12.61	5.01	60.00	50.00	Line	-47.39	Complied	-44.99	Complied	
6	24.2413	19.89	15.85	1.97	60.00	50.00	Line	-44.15	Complied	-48.03	Complied	
7	0.1777	34.86	27.89	12.01	64.59	54.59	Neutral	-36.70	Complied	-42.58	Complied	
8	2.3664	18.29	15.90	9.93	60.00	46.00	Neutral	-40.10	Complied	-36.07	Complied	
9	8.4692	56.57	52.76	39.80	60.00	50.00	Neutral	-7.24	Complied	-10.20	Complied	
10	11.3757	32.13	27.90	17.76	60.00	50.00	Neutral	-32.10	Complied	-32.24	Complied	
11	17.2852	19.12	15.51	8.98	60.00	50.00	Neutral	-44.49	Complied	-41.02	Complied	
12	24.2413	19.28	15.33	1.49	60.00	50.00	Neutral	-44.67	Complied	-48.51	Complied	
Tested by: David Hollis												
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009												
CE22_B.xls Revised 21OCT2005												

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P10 9.0 Band TX=31

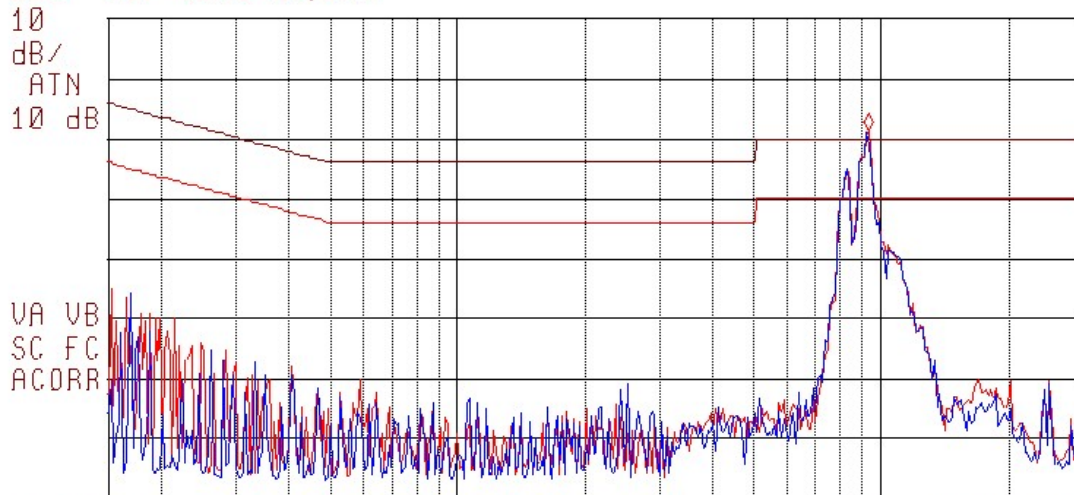
NOTES:

Conducted Emissions @ 120V/60Hz
P-10 9.0Tx Band
Line / Neutral

 16:05:33 JUL 24, 2009
TANZANITE P10 9.0 BAND 120/60

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 9.33 MHz
61.36 dB μ V/m

LOG REF 60.0 dB μ V/m



START 150 kHz STOP 30.00 MHz
L #IF BW 9.0 kHz AVG BW 30 kHz SWP 2.49 sec

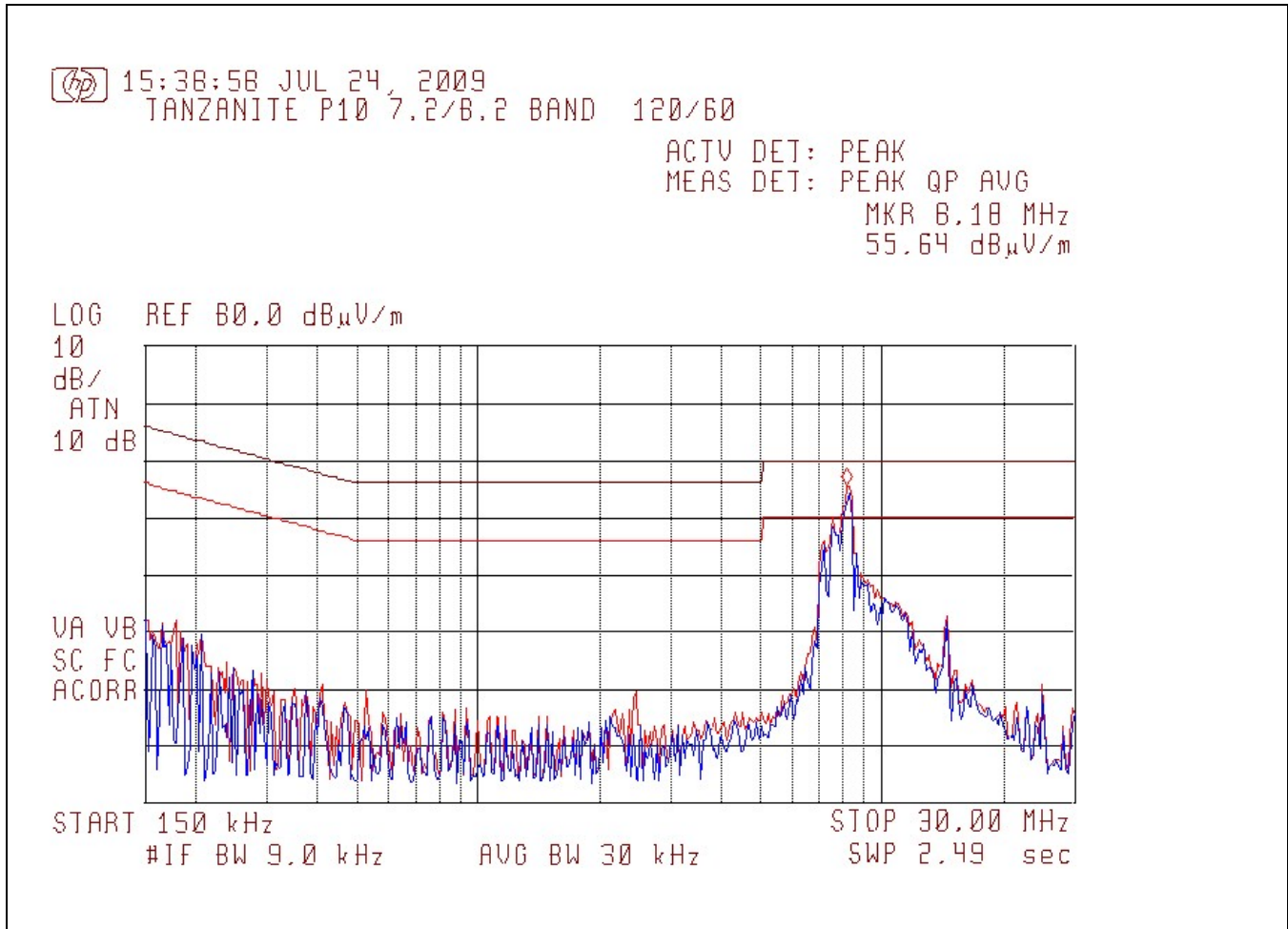
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Conducted Emissions Measurements												
Standard: FCC Part 15.207										Date: 7/24/09		
Device Tested: Evolve P10 PAB + SAB 9.0 band tx=31 120/60										File: .xls		
Signal Num	Freq MHz	Peak Amp dBuV	QP Amp dBuV	Avg Amp dBuV	QP Limit dBuV	Avg Limit dBuV	Conductor	QP Δ dB	QP Result	Avg Δ dB	Average Result	Mode
1	0.1769	35.68	27.13	11.67	64.63	54.63	Line	-37.50	Complied	-42.96	Complied	
2	2.4272	21.25	19.33	12.19	56.00	46.00	Line	-36.67	Complied	-33.81	Complied	
3	8.3339	55.94	52.30	35.39	60.00	50.00	Line	-7.70	Complied	-14.61	Complied	
4	9.3442	61.80	58.09	40.99	60.00	50.00	Line	-1.91	Complied	-9.01	Complied	Maximum Emissions
5	17.1000	17.26	13.88	5.99	60.00	50.00	Line	-46.12	Complied	-44.01	Complied	
6	24.2289	18.76	15.24	1.75	60.00	50.00	Line	-44.76	Complied	-48.25	Complied	
7	0.1769	34.76	27.86	12.01	64.63	54.63	Neutral	-36.77	Complied	-42.62	Complied	
8	2.4272	17.69	15.60	9.76	56.00	46.00	Neutral	-40.40	Complied	-36.24	Complied	
9	8.3339	55.28	51.60	34.66	60.00	50.00	Neutral	-8.40	Complied	-15.34	Complied	
10	9.3442	61.67	57.97	41.04	60.00	50.00	Neutral	-2.03	Complied	-8.96	Complied	
11	17.1000	19.97	16.89	9.69	60.00	50.00	Neutral	-43.11	Complied	-40.31	Complied	
12	24.2289	18.11	14.76	1.69	60.00	50.00	Neutral	-45.24	Complied	-48.31	Complied	
Tested by: David Hollis												
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009												
<small>CE22_B.xls Revised 21OCT2005</small>												

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P10 7.2/8.2 Band TX=31

NOTES: **Conducted Emissions @ 120V/60Hz**
P-10 7.2/8.2Tx Band
Line / Neutral



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Conducted Emissions Measurements												
Standard: FCC Part 15.207										Date: 7/24/09		
Device Tested: Evolve P10 PAB + SAB 7.2/8.2 band tx=31 120/60										File: .xls		
Signal Num	Freq MHz	Peak Amp dBuV	QP Amp dBuV	Avg Amp dBuV	QP Limit dBuV	Avg Limit dBuV	Conductor	QP Δ dB	QP Result	Avg Δ dB	Average Result	Mode
1	0.1770	35.71	28.27	9.90	64.62	54.62	Line	-36.35	Complied	-44.72	Complied	
2	1.0643	19.66	17.81	13.60	56.00	46.00	Line	-38.19	Complied	-32.40	Complied	
3	2.4803	19.42	15.77	7.68	56.00	46.00	Line	-40.23	Complied	-38.32	Complied	
4	8.3269	53.12	51.95	32.56	60.00	50.00	Line	-8.05	Complied	-17.44	Complied	
5	12.7496	27.81	26.42	14.00	60.00	50.00	Line	-33.58	Complied	-36.00	Complied	
6	16.1395	25.43	22.51	5.79	60.00	50.00	Line	-37.49	Complied	-44.21	Complied	
7	0.1770	36.26	28.16	10.31	64.62	54.62	Neutral	-36.46	Complied	-44.31	Complied	
8	1.0643	23.21	21.50	16.68	56.00	46.00	Neutral	-34.50	Complied	-29.32	Complied	
9	2.4803	22.59	18.83	10.47	56.00	46.00	Neutral	-37.17	Complied	-35.53	Complied	
10	8.3269	53.87	52.63	33.27	60.00	50.00	Neutral	-7.37	Complied	-16.73	Complied	Maximum Emissions
11	12.7496	27.99	26.61	14.12	60.00	50.00	Neutral	-33.39	Complied	-35.88	Complied	
12	16.1395	22.02	18.41	2.85	60.00	50.00	Neutral	-41.59	Complied	-47.15	Complied	
Tested by: David Hollis												
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009										CE22_B.xls Revised 21OCT2005		

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G20 8.2 Band TX=27

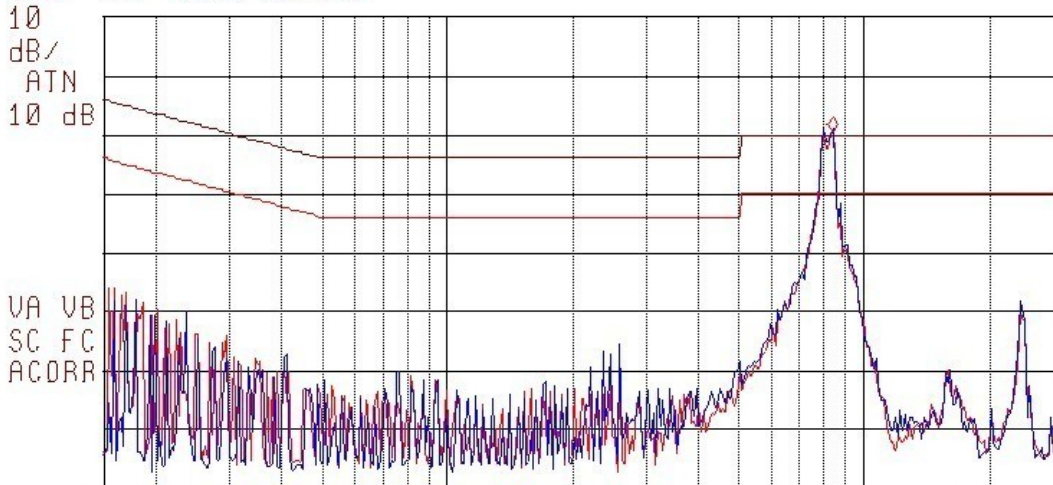
NOTES:

Conducted Emissions @ 120V/60Hz
G-20 8.2 Tx Band
Line / Neutral

 13:28:35 JUL 21, 2009
TANZANITE G20 8.2 BAND TX=27 120/60

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 6.43 MHz
60.37 dB μ V/m

LOG REF 60.0 dB μ V/m



START 150 kHz STOP 30.00 MHz
L #IF BW 9.0 kHz AVG BW 30 kHz SWP 2.49 sec

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Conducted Emissions Measurements												
Standard: FCC Part 15.207											Date: 7/21/09	
Device Tested: Evolve G20 PAB + SAB 8.2 band tx=27 120/60											File: .xls	
Signal Num	Freq MHz	Peak Amp dBuV	QP Amp dBuV	Avg Amp dBuV	QP Limit dBuV	Avg Limit dBuV	Conductor	QP Δ dB	QP Result	Avg Δ dB	Average Result	Mode
1	0.2391	28.53	20.33	8.89	62.13	52.13	Line	-41.80	Complied	-43.24	Complied	
2	1.1227	18.49	16.51	12.12	56.00	46.00	Line	-39.49	Complied	-33.88	Complied	
3	2.5391	19.81	15.85	6.60	56.00	46.00	Line	-40.15	Complied	-39.40	Complied	
4	8.4271	60.62	57.78	46.69	60.00	50.00	Line	-2.22	Complied	-3.31	Complied	Maximum Emissions
5	15.9060	21.80	16.34	6.32	60.00	50.00	Line	-43.66	Complied	-43.68	Complied	
6	23.7801	31.84	28.49	14.49	60.00	50.00	Line	-31.51	Complied	-35.51	Complied	
7	0.2391	27.34	20.47	8.40	62.13	52.13	Neutral	-41.66	Complied	-43.73	Complied	
8	1.1227	14.93	12.13	7.14	56.00	46.00	Neutral	-43.87	Complied	-38.86	Complied	
9	2.5391	17.28	13.28	4.31	56.00	46.00	Neutral	-42.72	Complied	-41.69	Complied	
10	8.4271	59.32	56.42	45.26	60.00	50.00	Neutral	-3.58	Complied	-4.74	Complied	
11	15.9060	21.08	16.69	7.52	60.00	50.00	Neutral	-43.31	Complied	-42.48	Complied	
12	23.7801	31.42	27.87	13.82	60.00	50.00	Neutral	-32.13	Complied	-36.18	Complied	
Tested by: David Hollis												
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009												


CE22_B.xls Revised 21OCT2005

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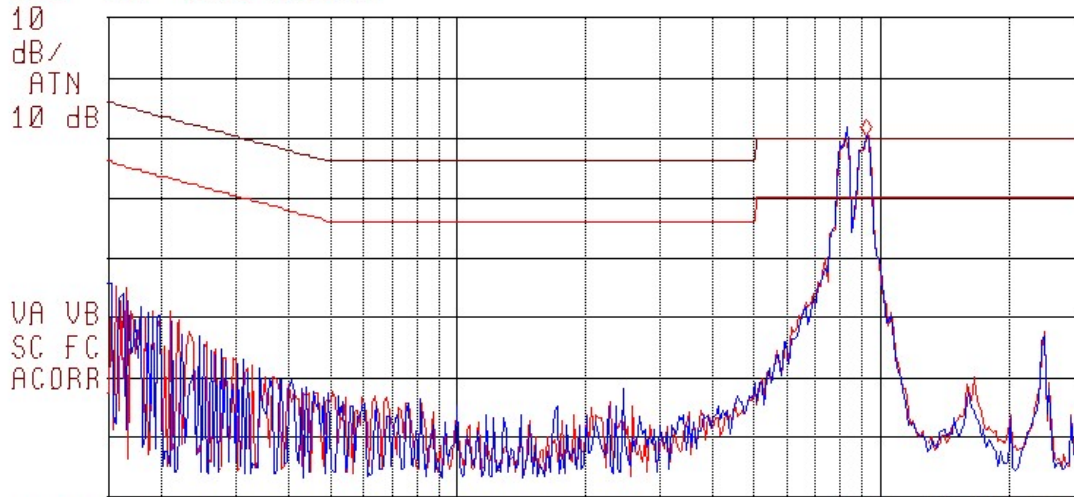
G20 9.0 Band TX=27

NOTES:

Conducted Emissions @ 120V/60Hz
G-20 9.0 Tx Band
Line / Neutral

 14:28:24 JUL 21, 2009
TANZANITE G20 9.0 BAND TX=27 120/60
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 9.20 MHz
60.37 dB μ V/m

LOG REF 60.0 dB μ V/m



START 150 kHz STOP 30.00 MHz
L #IF BW 9.0 kHz AVG BW 30 kHz SWP 2.49 sec

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Conducted Emissions Measurements												
Standard: FCC Part 15.207											Date: 7/21/09	
Device Tested: Evolve G20 PAB + SAB 9.0 band tx=27 120/60											File: .xls	
Signal Num	Freq MHz	Peak Amp dBuV	QP Amp dBuV	Avg Amp dBuV	QP Limit dBuV	Avg Limit dBuV	Conductor	QP Δ dB	QP Result	Avg Δ dB	Average Result	Mode
1	0.2388	28.91	22.07	9.39	62.14	52.14	Line	-40.07	Complied	-42.75	Complied	
2	1.1223	18.16	16.51	11.68	56.00	46.00	Line	-39.49	Complied	-34.32	Complied	
3	2.5987	19.70	16.25	7.12	56.00	46.00	Line	-39.75	Complied	-38.88	Complied	
4	8.3436	60.35	56.98	41.13	60.00	50.00	Line	-3.02	Complied	-8.87	Complied	Maximum Emissions
5	9.0701	58.61	56.77	41.63	60.00	50.00	Line	-3.23	Complied	-8.37	Complied	
6	16.1154	18.68	14.53	0.89	60.00	50.00	Line	-45.47	Complied	-49.11	Complied	
7	23.8111	20.01	16.27	2.85	60.00	50.00	Line	-43.73	Complied	-47.15	Complied	
8	0.2388	28.09	20.63	8.77	62.14	52.14	Neutral	-41.51	Complied	-43.37	Complied	
9	1.1223	14.73	12.13	6.79	56.00	46.00	Neutral	-43.87	Complied	-39.21	Complied	
10	2.5987	15.23	10.87	3.62	56.00	46.00	Neutral	-45.13	Complied	-42.38	Complied	
11	8.3436	59.04	55.67	39.74	60.00	50.00	Neutral	-4.33	Complied	-10.26	Complied	
12	9.0701	57.59	55.74	40.74	60.00	50.00	Neutral	-4.26	Complied	-9.26	Complied	
13	16.1154	18.23	14.08	0.90	60.00	50.00	Neutral	-45.92	Complied	-49.10	Complied	
14	23.8111	19.88	15.91	2.55	60.00	50.00	Neutral	-44.09	Complied	-47.45	Complied	
Tested by: David Hollis												
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009												


CE22_B.xls Revised 21OCT2005

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G10 8.2 Band TX=27

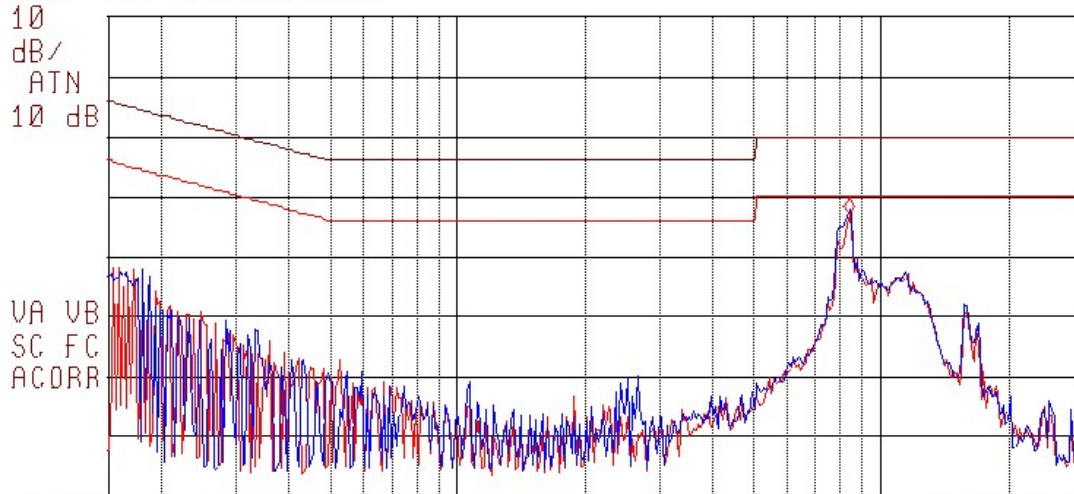
NOTES:

Conducted Emissions @ 120V/60Hz
G-10 8.2 Tx Band
Line / Neutral

 13:56:14 JUL 24, 2009
TANZANITE G10 B.2 BAND 120/60

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 8.43 MHz
47.03 dB μ V/m

LOG REF 60.0 dB μ V/m



START 150 kHz STOP 30.00 MHz
#IF BW 9.0 kHz AVG BW 30 kHz SWP 2.49 sec

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Conducted Emissions Measurements												
Standard: FCC Part 15.207										Date: 7/24/09		
Device Tested: Evolve G10 PAB + SAB 8.2 band tx=27 120/60										File: .xls		
Signal Num	Freq MHz	Peak Amp dBuV	QP Amp dBuV	Avg Amp dBuV	QP Limit dBuV	Avg Limit dBuV	Conductor	QP Δ dB	QP Result	Avg Δ dB	Average Result	Mode
1	0.1777	38.75	27.89	9.92	64.59	54.59	Line	-36.70	Complied	-44.67	Complied	
2	1.1232	17.85	12.26	6.09	56.00	46.00	Line	-43.74	Complied	-39.91	Complied	
3	2.3641	17.31	13.34	4.85	56.00	46.00	Line	-42.66	Complied	-41.15	Complied	
4	8.5157	47.70	46.61	30.25	60.00	50.00	Line	-13.39	Complied	-19.75	Complied	
5	9.3130	37.06	35.92	21.86	60.00	50.00	Line	-24.08	Complied	-28.14	Complied	
6	15.8744	34.12	30.85	13.20	60.00	50.00	Line	-29.15	Complied	-36.80	Complied	
7	0.1777	37.44	27.83	10.35	64.59	54.59	Neutral	-36.76	Complied	-44.24	Complied	
8	1.1232	18.88	16.31	10.67	56.00	46.00	Neutral	-39.69	Complied	-35.33	Complied	
9	2.3641	19.60	15.90	5.64	56.00	46.00	Neutral	-40.10	Complied	-40.36	Complied	
10	8.5157	48.30	47.22	30.60	60.00	50.00	Neutral	-12.78	Complied	-19.40	Complied	Maximum Emissions
11	9.3130	37.22	35.99	21.76	60.00	50.00	Neutral	-24.01	Complied	-28.24	Complied	
12	15.8744	33.53	31.58	13.33	60.00	50.00	Neutral	-28.42	Complied	-36.67	Complied	
Tested by: David Hollis												
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009										CE22_B.xls Revised 21OCT2005		

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G10 9.0 Band TX=27

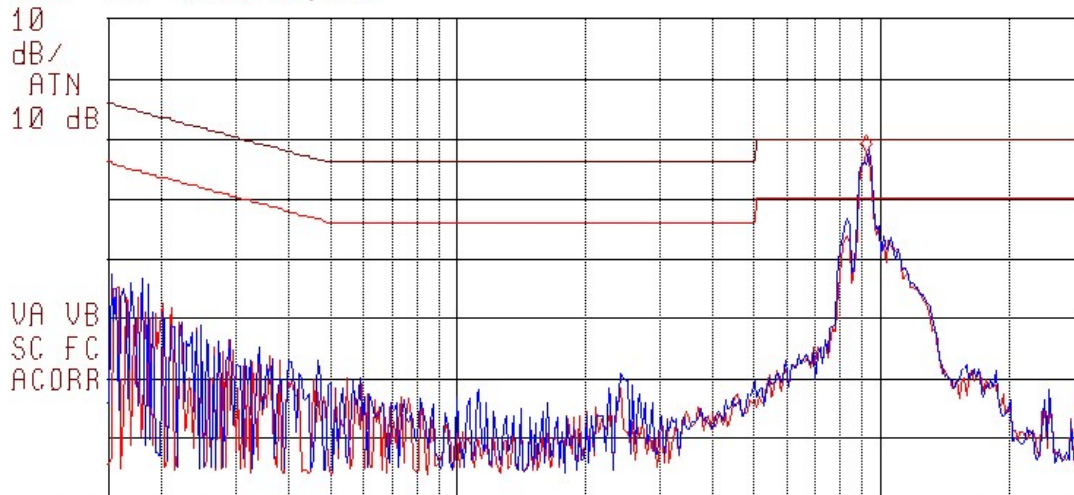
NOTES:

Conducted Emissions @ 120V/60Hz
G-10 9.0 Tx Band
Line / Neutral

 12:59:37 JUL 24, 2009
TANZANITE G10 9.0 BAND 120/60

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 9.20 MHz
57.88 dB μ V/m

LOG REF 80.0 dB μ V/m



START 150 kHz STOP 30.00 MHz
#IF BW 9.0 kHz AVG BW 30 kHz SWP 2.49 sec

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Conducted Emissions Measurements												
Standard: FCC Part 15.207										Date: 7/24/09		
Device Tested: Evolve G10 PAB + SAB 9.0 band tx=27 120/60										File: .xls		
Signal Num	Freq MHz	Peak Amp dBuV	QP Amp dBuV	Avg Amp dBuV	QP Limit dBuV	Avg Limit dBuV	Conductor	QP Δ dB	QP Result	Avg Δ dB	Average Result	Mode
1	0.1768	37.23	28.79	11.23	64.64	54.64	Line	-35.85	Complied	-43.41	Complied	
2	0.9468	16.07	14.12	9.04	56.00	46.00	Line	-41.88	Complied	-36.96	Complied	
3	2.4251	18.63	15.09	7.78	56.00	46.00	Line	-40.91	Complied	-38.22	Complied	
4	8.3724	44.14	43.08	24.49	60.00	50.00	Line	-16.92	Complied	-25.51	Complied	
5	9.3252	56.16	54.78	35.44	60.00	50.00	Line	-5.22	Complied	-14.56	Complied	
6	24.9814	25.67	22.71	9.23	60.00	50.00	Line	-37.29	Complied	-40.77	Complied	
7	0.1768	34.90	27.88	10.35	64.64	54.64	Neutral	-36.76	Complied	-44.29	Complied	
8	0.9468	19.47	15.86	10.11	56.00	46.00	Neutral	-40.14	Complied	-35.89	Complied	
9	2.4251	21.64	18.90	9.96	56.00	46.00	Neutral	-37.10	Complied	-36.04	Complied	
10	8.3724	44.99	43.88	25.58	60.00	50.00	Neutral	-16.12	Complied	-24.42	Complied	
11	9.3252	56.32	54.94	35.43	60.00	50.00	Neutral	-5.06	Complied	-14.57	Complied	Maximum Emissions
12	24.9814	26.35	23.14	9.23	60.00	50.00	Neutral	-36.86	Complied	-40.77	Complied	


Tested by: David Hollis
 TÜV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009

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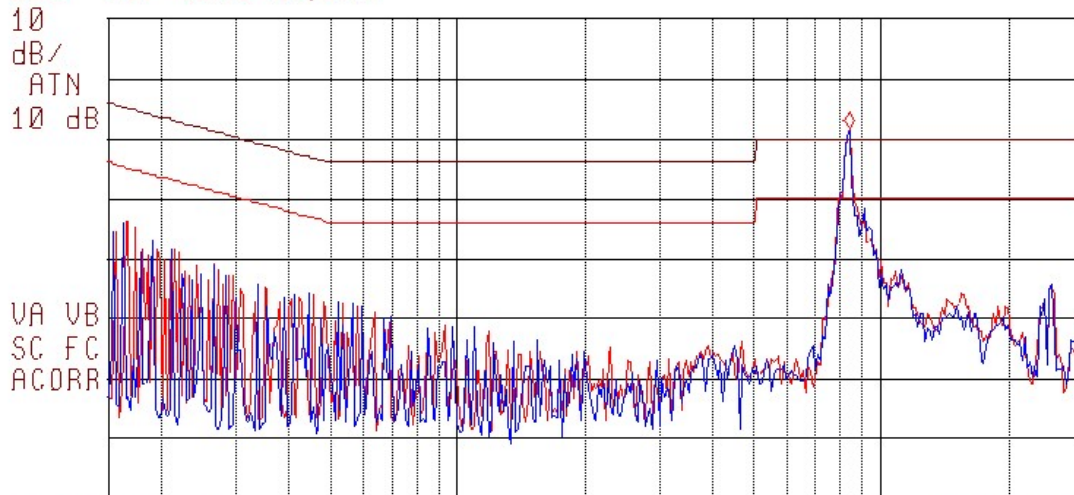
S10 8.2 Band TX=31

NOTES:

Conducted Emissions @ 120V/60Hz
S-10 8.2 Tx Band
Line / Neutral

 09:59:40 JUL 22, 2009
TANZANITE S10 8.2 BAND TX=31 120/60
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 6.43 MHz
61.71 dB μ V/m

LOG REF 60.0 dB μ V/m



START 150 kHz STOP 30.00 MHz
L #IF BW 9.0 kHz AVG BW 30 kHz SWP 2.49 sec

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Conducted Emissions Measurements												
Standard: FCC Part 15.207 Class B											Date: 7/22/09	
Device Tested: Evolve S10 PAB + SAB 8.2 band TX=31 120/60											File: .xls	
Signal Num	Freq MHz	Peak Amp dBuV	QP Amp dBuV	Avg Amp dBuV	QP Limit dBuV	Avg Limit dBuV	Conductor	QP Δ dB	QP Result	Avg Δ dB	Average Result	Mode
1	0.1886	45.73	36.59	19.94	64.10	54.10	Line	-27.51	Complied	-34.16	Complied	
2	0.9337	31.14	25.12	19.75	56.00	46.00	Line	-30.88	Complied	-26.25	Complied	
3	4.5470	27.31	24.02	16.32	56.00	46.00	Line	-31.98	Complied	-29.68	Complied	
4	8.4840	62.33	58.63	42.37	60.00	50.00	Line	-1.37	Complied	-7.63	Complied	Maximum Emissions
5	19.0084	31.92	28.92	20.48	60.00	50.00	Line	-31.08	Complied	-29.52	Complied	
6	25.3586	35.95	34.38	18.36	60.00	50.00	Line	-25.62	Complied	-31.64	Complied	
7	0.1886	45.81	36.95	20.17	64.10	54.10	Neutral	-27.15	Complied	-33.93	Complied	
8	0.9337	33.50	29.21	23.98	56.00	46.00	Neutral	-26.79	Complied	-22.02	Complied	
9	4.5470	28.33	25.43	18.15	56.00	46.00	Neutral	-30.57	Complied	-27.85	Complied	
10	8.4840	61.75	58.11	42.50	60.00	50.00	Neutral	-1.89	Complied	-7.50	Complied	
11	19.0084	32.05	28.86	19.30	60.00	50.00	Neutral	-31.14	Complied	-30.70	Complied	
12	25.3586	36.49	34.71	18.61	60.00	50.00	Neutral	-25.29	Complied	-31.39	Complied	
Tested by: David Hollis												
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009												

CE22_B.45 Revised 21OCT2005

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4.2.6 Photos



Figure 11 – Conducted Emissions Test Setup – P-20

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Figure 12 – Conducted Emissions Test Setup – P-10

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Figure 13 – Conducted Emissions Test Setup – G-20

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Figure 14 – Conducted Emissions Test Setup – G-10

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Figure 15 – Conducted Emissions Test Setup – S-10

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4.3 Radiated Emissions Limits

This test measures the electromagnetic levels of spurious signals generated by the EUT that radiated from the EUT and may affect the performance of other nearby electronic equipment.

4.3.1 Test Over View

Results	Complies (as tested per this report)				Date	7/20/09	
Standard	FCC Part 15 Subpart 15.205 and 15.209						
Product Model	Evolve Antenna Family with Accessories		Serial#	See Section 3.5			
Configuration	See test plan for details						
Test Set-up	Tested on a 10m O.A.T.S. placed on turn-table, see test plans for details						
EUT Powered By	120V/60Hz	Temp	22° C	Humidity	45%	Pressure	1000mbar
Frequency Range	From Fundamental - 1000MHz						
Perf. Criteria	Below Limit		Perf. Verification	Readings under Limit			
Mod to EUT	None		Test Performed By	David Hollis			

4.3.2 Test Procedure

Radiated emissions tests were performed using the procedures of ANSI C63.4 including methods for signal maximizations and EUT configuration. The photos included with the report show the EUT in its maximized configuration.

The frequency range from 30MHz to 1000MHz was investigated for radiated emissions.

Radiated emission testing was first performed at a distance of 3 meters in the semi-anechoic chamber in order to identify the specific frequencies for which these measurements will be made. Harmonics and spurious emissions testing <30MHz were performed at 10m distance on the OATS using a magnetic field loop antenna. Harmonics and spurious emissions test >30MHz were performed on the 3 m OATS using a Bilog antenna

4.3.3 Deviations

There were no deviations from the test methodology listed in the test plan for the harmonic current emissions test.

4.3.4 Final Test

All final radiated emissions measurements were below (in compliance with) the limits. No emissions at harmonics of the fundamental frequencies were detected on any of the systems listed in this test report.

4.3.5 Final Measurement Data

P-20 8.2 Band TX=31 RE Final:

Radiated Emissions Measurements												
Standard: 47 CFR 15.209				PRESCAN or FINAL: Final				Date: 7/20/09				
Device Tested: Evolve P20 PAB + SAB 8.2 band tx=31				Distance: 3.0m				File:				
Measured Level												
Meas #	Freq (MHz)	Peak	Quasi-Peak	Average	Quasi-Peak Limit	Quasi-Peak Δ	Antenna + Cable Correction Factor (included in measured levels)	Result	Polarization	Angle (degrees)	Antenna Height (meters)	Comment
1	71.5750	35.09	29.83	9.66	40.00	-10.17	6.84	Complied	Vertical	0	1.00	
2	441.2125	48.26	43.02	14.12	46.00	-2.98	19.20	Complied	Vertical	160	1.00	
3	449.5725	50.24	44.48	16.49	46.00	-1.52	19.40	Complied	Vertical	160	1.00	
4	466.0250	46.96	41.73	13.03	46.00	-4.27	19.51	Complied	Vertical	160	1.00	
5	473.3625	44.03	38.57	11.50	46.00	-7.43	19.55	Complied	Vertical	160	1.00	
Tested by: David Hollis												
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009 REFCC15B.xls Revised 10MAR03												

P-20 9.0 Band TX=31 RE Final:

Radiated Emissions Measurements												
Standard: 47 CFR 15.209				PRESCAN or FINAL: Final				Date: 7/20/09				
Device Tested: Evolve P20 PAB + SAB 9.0 band tx=31				Distance: 3.0m				File:				
Measured Level												
Meas #	Freq (MHz)	Peak	Quasi-Peak	Average	Quasi-Peak Limit	Quasi-Peak Δ	Antenna + Cable Correction Factor (included in measured levels)	Result	Polarization	Angle (degrees)	Antenna Height (meters)	Comment
1	72.6150	40.19	35.32	11.18	40.00	-4.68	6.96	Complied	Vertical	270	1.00	
2	223.8250	43.71	38.94	8.07	46.00	-7.06	11.95	Complied	Vertical	270	1.00	
3	438.2354	48.62	43.14	13.17	46.00	-2.86	19.14	Complied	Horizontal	200	2.00	
4	444.5525	53.22	43.65	15.99	46.00	-2.35	19.28	Complied	Horizontal	200	2.00	
5	465.8938	52.07	44.50	15.62	46.00	-1.50	19.51	Complied	Horizontal	200	2.00	
6	468.2350	47.86	42.67	13.58	46.00	-3.33	19.52	Complied	Horizontal	200	2.00	
Tested by: David Hollis												
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009 REFCC15B.xls Revised 10MAR03												

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P-10 8.2 Band TX=31 RE Final:

Radiated Emissions Measurements												
Standard:		47 CFR 15.109(a), Class B				PRESCAN or FINAL:			Final	Date: 7/2/09		
Device Tested:		Evolve P10 PAB + SAB 8.2 band tx=31				Distance:			3.0m	File:		
MicroMetal output transformer, non glued plate transformer												
Measured Level												
Meas #	Freq (MHz)	Peak	Quasi-Peak	Average	Quasi-Peak Limit	Quasi-Peak Δ	Antenna + Cable Correction Factor (included in measured levels)	Result	Polarization	Angle (degrees)	Antenna Height (meters)	Comment
1	42.2987	44.19	38.96	14.64	40.00	-1.04	11.42	Complied	Vertical	240	1.00	
2	81.4077	28.94	19.61	11.12	40.00	-20.39	8.14	Complied	Vertical	360	1.00	
3	83.0000	27.17	20.84	13.05	40.00	-19.16	8.58	Complied	Vertical	360	1.00	
4	403.7875	44.43	39.67	10.81	46.00	-6.33	18.26	Complied	Vertical	270	1.00	
5	441.1875	50.30	44.32	13.33	46.00	-1.68	19.20	Complied	Vertical	270	1.00	
6	449.6000	49.03	43.74	12.79	46.00	-2.26	19.40	Complied	Vertical	270	1.00	
7	457.8625	45.75	40.16	11.59	46.00	-5.84	19.46	Complied	Vertical	180	1.90	
Tested by: David Hollis												
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009 REFCC15B.xls Revised 10MAR03												

P-10 9.0 Band TX=31 RE Final:

Radiated Emissions Measurements												
Standard:		47 CFR 15.209, Class B				PRESCAN or FINAL:			Final	Date: 7/2/09		
Device Tested:		Evolve P10 PAB + SAB 9.0 band tx=31				Distance:			3.0m	File:		
RG-59 cable tightened												
MicroMetal output transformer, non glued plate transformer												
Measured Level												
Meas #	Freq (MHz)	Peak	Quasi-Peak	Average	Quasi-Peak Limit	Quasi-Peak Δ	Antenna + Cable Correction Factor (included in measured levels)	Result	Polarization	Angle (degrees)	Antenna Height (meters)	Comment
1	46.6475	41.60	36.50	15.10	40.00	-3.50	9.85	Complied	Vertical	90	1.00	
2	56.5500	38.99	33.96	9.96	40.00	-6.04	7.77	Complied	Vertical	180	2.00	
3	410.3125	38.82	33.66	9.48	46.00	-12.34	18.44	Complied	Vertical	135	1.50	
4	419.6700	43.97	38.56	12.71	46.00	-7.44	18.69	Complied	Vertical	270	1.50	
5	444.2250	44.98	39.61	14.00	46.00	-6.39	19.27	Complied	Horizontal	300	2.00	
Tested by: David Hollis												
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009 REFCC15B.xls Revised 10MAR03												

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P-10 7.2/8.2 Band TX=31 RE Final:

Radiated Emissions Measurements													
Standard:		47 CFR 15.209, Class B				PRESCAN or FINAL:			Final	Date: 7/17/09			
Device Tested:		Evolve P10 PAB + SAB 7.2/8.2 band tx=31				Distance:			3.0m	File:			
Measured Level													
Meas #	Freq (MHz)	Peak	Quasi-Peak	Average	Quasi-Peak Limit	Quasi-Peak Δ	Antenna + Cable Correction Factor (included in measured levels)	Result	Polarization	Angle (degrees)	Antenna Height (meters)	Comment	
1	441.3000	50.17	44.93	13.93	46.00	-1.07	19.21	Complied	Vertical	0	1.50		
2	452.5000	53.70	43.63	15.92	46.00	-2.37	19.42	Complied	Vertical	0	1.50		
3	460.5500	51.29	43.42	16.35	46.00	-2.58	19.47	Complied	Vertical	0	1.50		
4	466.5000	55.90	44.44	14.96	46.00	-1.56	19.51	Complied	Vertical	0	1.50		
5	474.7305	50.08	44.46	15.98	46.00	-1.54	19.56	Complied	Vertical	0	1.50		
Tested by: David Hollis													
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009 REFC15B.xls Revised 10MAR03													

G-20 8.2 Band TX=27 RE Final:

Radiated Emissions Measurements													
Standard:		47 CFR 15.209				PRESCAN or FINAL:			Final	Date: 7/20/09			
Device Tested:		Evolve G20 PAB + SAB 8.2 band tx=27				Distance:			3.0m	File:			
Measured Level													
Meas #	Freq (MHz)	Peak	Quasi-Peak	Average	Quasi-Peak Limit	Quasi-Peak Δ	Antenna + Cable Correction Factor (included in measured levels)	Result	Polarization	Angle (degrees)	Antenna Height (meters)	Comment	
1	39.725	41.61	34.43	6.16	40.00	-5.57	12.45	Complied	Vertical	210	1.00		
2	74.9475	32.92	25.59	14.05	40.00	-14.41	7.21	Complied	Vertical	90	1.00		
3	109.84	37.76	32.33	7.59	43.50	-11.17	12.66	Complied	Vertical	90	1.00		
4	135.15	38.78	34.27	10.2	43.50	-9.23	12.43	Complied	Vertical	90	1.00		
5	416.3	48.73	43.23	12.57	46.00	-2.77	18.60	Complied	Vertical	180	1.00		
6	436.8125	49.56	43.88	15.68	46.00	-2.12	19.10	Complied	Vertical	180	1.00		
7	474.55	45.7	39.66	11.65	46.00	-6.34	19.56	Complied	Vertical	180	1.00		
Tested by: David Hollis													
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009 REFC15B.xls Revised 10MAR03													

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G-20 9.0 Band TX=27 RE Final:

Radiated Emissions Measurements													
Standard:		47 CFR 15.209				PRESCAN or FINAL:			Final	Date: 7/20/09			
Device Tested:		Evolve G20 PAB + SAB 9.0 band tx=27				Distance:			3.0m	File:			
Measured Level													
Meas #	Freq (MHz)	Peak	Quasi-Peak	Average	Quasi-Peak Limit	Quasi-Peak Δ	Antenna + Cable Correction Factor (included in measured levels)	Result	Polarization	Angle (degrees)	Antenna Height (meters)	Comment	
1	45.3750	42.30	37.31	9.86	40.00	-2.69	10.29	Complied	Horizontal	90	1.00		
2	72.6875	35.10	28.21	14.74	40.00	-11.79	6.97	Complied	Horizontal	0	1.00		
3	81.6875	39.71	33.16	13.73	40.00	-6.84	8.22	Complied	Horizontal	0	1.00		
4	111.9125	40.70	35.50	7.05	43.50	-8.00	12.84	Complied	Horizontal	0	1.00		
5	417.5000	49.19	43.54	13.00	46.00	-2.46	18.63	Complied	Vertical	340	1.00		
6	453.7875	44.00	38.41	11.09	46.00	-7.59	19.43	Complied	Vertical	340	1.00		
7	490.0375	47.34	42.34	15.24	46.00	-3.66	19.84	Complied	Vertical	290	2.00		
8	544.6125	49.64	44.28	17.25	46.00	-1.72	21.34	Complied	Vertical	300	2.00		
Tested by: David Hollis													
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009 REFCC15B.xlt Revised 10MAR03													

G-10 8.2 Band TX=31 RE Final:

Radiated Emissions Measurements													
Standard:		47 CFR 15.109(a), Class B				PRESCAN or FINAL:			Final	Date: 7/2/09			
Device Tested:		Evolve G10 PAB + SAB 8.2 band tx= 31				Distance:			3.0m	File:			
Measured Level													
Meas #	Freq (MHz)	Peak	Quasi-Peak	Average	Quasi-Peak Limit	Quasi-Peak Δ	Antenna + Cable Correction Factor (included in measured levels)	Result	Polarization	Angle (degrees)	Antenna Height (meters)	Comment	
1	41.6250	38.80	33.25	13.44	40.00	-6.75	11.68	Complied	Vertical	330	1.90		
2	416.2875	47.55	42.30	12.30	46.00	-3.70	18.60	Complied	Vertical	130	1.90		
3	419.9500	47.19	42.33	12.07	46.00	-3.67	18.69	Complied	Vertical	200	1.00		
4	432.9250	48.02	43.42	12.38	46.00	-2.58	19.01	Complied	Vertical	200	1.00		
5	473.2550	48.13	42.64	12.98	46.00	-3.36	19.55	Complied	Vertical	210	1.00		
6	492.6375	46.16	41.21	12.52	46.00	-4.79	19.89	Complied	Vertical	210	1.00		
Tested by: David Hollis													
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009 REFCC15B.xlt Revised 10MAR03													

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G-10 9.0 Band TX=27 RE Final:

Radiated Emissions Measurements												
Standard:	47 CFR 15.109(a), Class B				PRESCAN or FINAL:			Final	Date: 7/14/09			
Device Tested:	Evolve G10 PAB + SAB 9.0 Band tx=31				Distance:			3.0m	File:			
Tested with modem, visiplus, wired voice alarm present												
Measured Level												
Meas #	Freq (MHz)	Peak	Quasi-Peak	Average	Quasi-Peak Limit	Quasi-Peak Δ	Antenna + Cable Correction Factor (included in measured levels)	Result	Polarization	Angle (degrees)	Antenna Height (meters)	Comment
1	58.2625	42.22	37.44	9.42	40.00	-2.56	7.54	Complied	Vertical	240	1.00	
2	63.5350	40.38	35.49	10.77	40.00	-4.51	7.08	Complied	Vertical	240	1.00	
3	424.5750	48.32	43.45	12.40	46.00	-2.55	18.81	Complied	Vertical	240	1.50	
4	433.0000	47.60	42.68	12.34	46.00	-3.32	19.01	Complied	Vertical	240	1.50	
5	436.0875	49.27	44.51	14.10	46.00	-1.49	19.09	Complied	Vertical	240	1.50	
6	441.2000	49.11	43.96	13.02	46.00	-2.04	19.20	Complied	Vertical	240	1.50	
Tested by: David Hollis												
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009 REFCC15B.xlt Revised 10MAR03												

S-10 8.2 Band TX=31 RE Final:

Radiated Emissions Measurements												
Standard:	47 CFR 15.209, Class B				PRESCAN or FINAL:			Final	Date: 7/14/09			
Device Tested:	Evolve S10 PAB + SAB 8.2 Band tx=31				Distance:			3.0m	File:			
Tested with modem, visiplus, wired voice alarm present												
Measured Level												
Meas #	Freq (MHz)	Peak	Quasi-Peak	Average	Quasi-Peak Limit	Quasi-Peak Δ	Antenna + Cable Correction Factor (included in measured levels)	Result	Polarization	Angle (degrees)	Antenna Height (meters)	Comment
1	58.2875	34.97	29.67	10.16	40.00	-10.33	7.54	Complied	Vertical	0	1.00	
2	59.1550	35.45	29.90	9.87	40.00	-10.10	7.42	Complied	Vertical	0	1.00	
3	66.6000	30.14	24.05	8.27	40.00	-15.95	6.88	Complied	Vertical	200	1.00	
4	79.5000	36.96	31.97	7.23	40.00	-8.03	7.69	Complied	Vertical	220	1.00	
5	421.5000	44.25	39.14	10.96	46.00	-6.86	18.73	Complied	Vertical	0	1.00	
6	422.4875	46.36	41.65	11.99	46.00	-4.35	18.76	Complied	Vertical	0	1.00	
7	429.3625	46.57	41.73	11.51	46.00	-4.27	18.93	Complied	Vertical	0	1.00	
8	439.4375	35.57	30.28	9.39	46.00	-15.72	19.16	Complied	Vertical	0	1.00	
Tested by: David Hollis												
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009 REFCC15B.xlt Revised 10MAR03												

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4.3.6 Operation in Restricted Bands

The EUT is a digital swept frequency hopping transmitter. The EUT hops on discrete frequencies. The discrete frequencies that can be transmitted by the EUT are as follows:

Frequency Band	Band width	Actual Transmitted frequencies (MHz)	Region
8.2	7.950 to 8.450 MHz	8.450, 8.325, 8.075, 7.950	NAM and EU
8.6	8.075 to 9.125 MHz	9.125, 8.875, 8.325, 8.075	NAM
9	8.075 to 9.325 MHz	9.325, 9.075, 8.325, 8.075	NAM
9.5	9.200 to 9.800 MHz	9.800, 9.600, 9.400, 9.200	NAM
7.2 + 8.2	7.200 to 8.325 MHz	8.325, 8.075, 7.600, 7.200	NAM

The restricted frequency bands (per FCC Part 15 Clause 15.205) in the operating frequency band of the EUT are as follows:

8.291 – 8.294 MHz
8.362 – 8.366 MHz
8.37625 – 8.38675 MHz
8.41425 – 8.41475 MHz

The transmitter is not capable of hopping into, or operating, in the restricted frequency bands and therefore complies with the restriction.

4.4 Emissions Bandwidth

This test measures the emission bandwidth of the fundamental frequency generated by the EUT that may be outside the allowed transmission frequency

4.4.1 Test Over View

Results	Complies (as tested per this report)				Date	7/20/09	
Standard	FCC Part 15 Subpart 15.215 and RSS-210						
Product Model	Evolve Antenna Family with Accessories	Serial#	See Section 3.5				
Configuration	See test plan for details						
Test Set-up	Tested on a 10m O.A.T.S. placed on turn-table, see test plans for details						
EUT Powered By	120V/60Hz	Temp	22° C	Humidity	45%	Pressure	1000mbar
Frequency Range	8.2MHz and 9.0MHz Band						
Perf. Criteria	Within Frequency Range	Perf. Verification	Readings under Limit				
Mod to EUT	None	Test Performed By	David Hollis				

4.4.2 Test Procedure

The emissions of the fundamental were measured with a loop antenna in 3 orthogonal orientations. The measurement of the bandwidth was done at -6db and -20dB on each side of the fundamental frequency. The test method includes signal maximizations of EUT configuration, by turning the turntable 360degrees and recording the highest emissions. The photos included with the report show the EUT in its maximized configuration.

4.4.3 Deviations

There were no deviations from the test methodology listed in the test plan for the Bandwidth Emissions test.

4.4.4 Final Test

All final radiated emissions measurements were below (in compliance with) the limits.

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4.4.5 Final Measurement Data

NOTES:

Emission Bandwidth
 P20 8.2 Band
 6dB Bandwidth

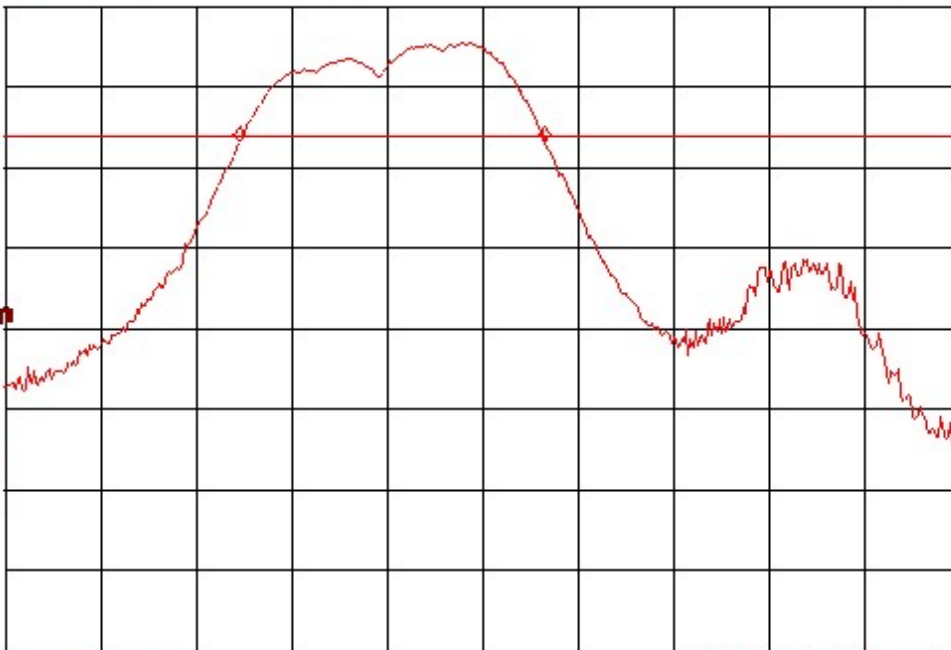


CHECKPOINT TANZANITE P20 8.2 BAND 6dB BW MKR Δ 960 kHz
 REF 80.0 dB μ V/m AT 10 dB .06 dB

PEAK
 LOG
 S
 dB

DL
 72.0
 dB μ V/m

VA SB
 SC FC
 ACORR



START 7.000 MHz STOP 10.000 MHz
 RES BW 300 kHz VBW 300 kHz SUP 20.0 msec

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NOTES:

Emission Bandwidth
P-20 8.2 Band
20 dB Bandwidth

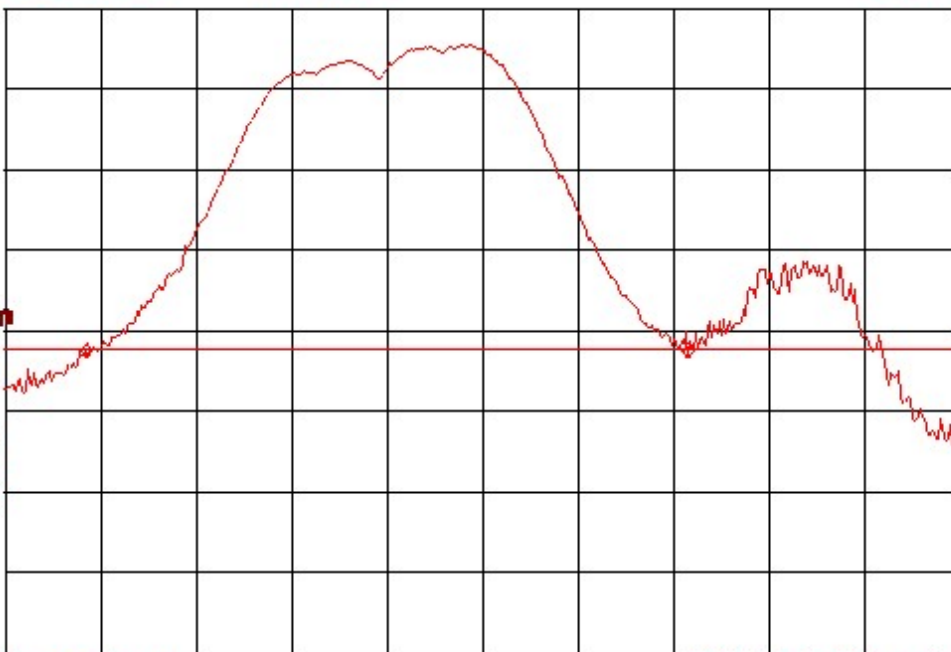


CHECKPOINT TANZANITE P20 8.2 20dB BW MKR Δ 1.890 MHz
REF 80.0 dB μ V/m AT 10 dB - .05 dB

PEAK
LOG
S
dB

DL
58.8
dB μ V/m

VA SB
SC FC
ACORR

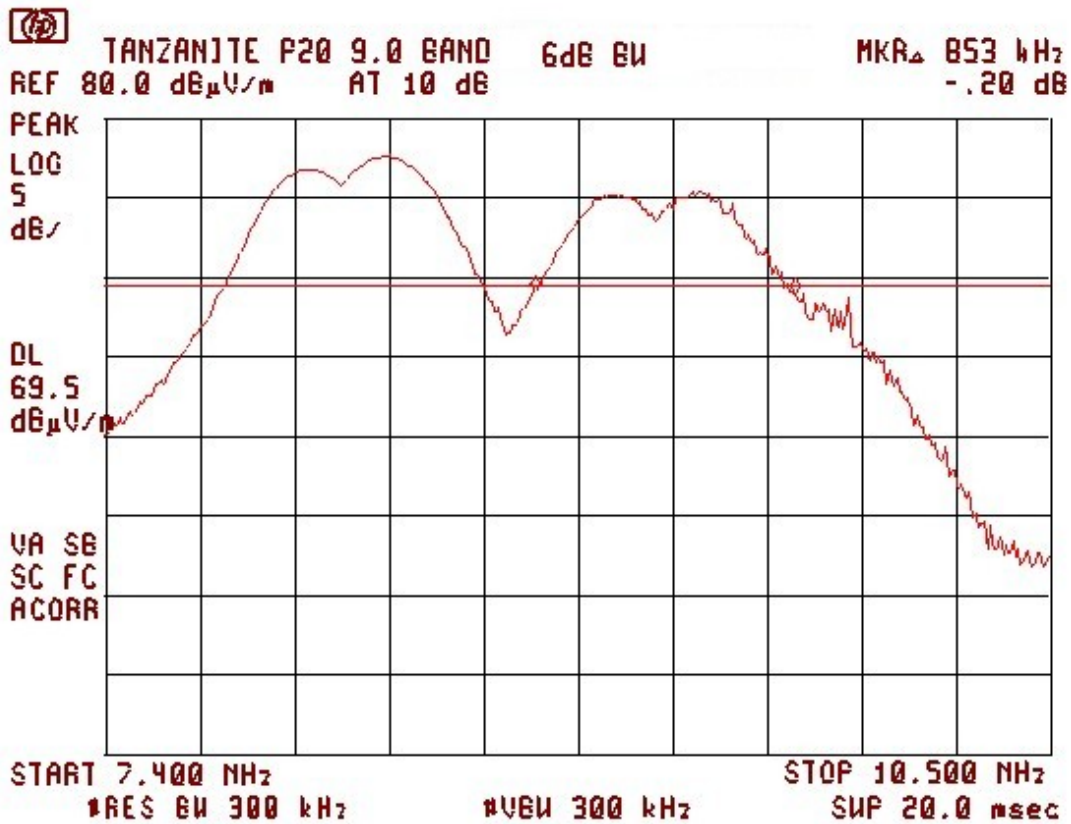


START 7.000 MHz STOP 10.000 MHz
RES BW 300 kHz RES BW 300 kHz SWP 20.0 msec

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NOTES:

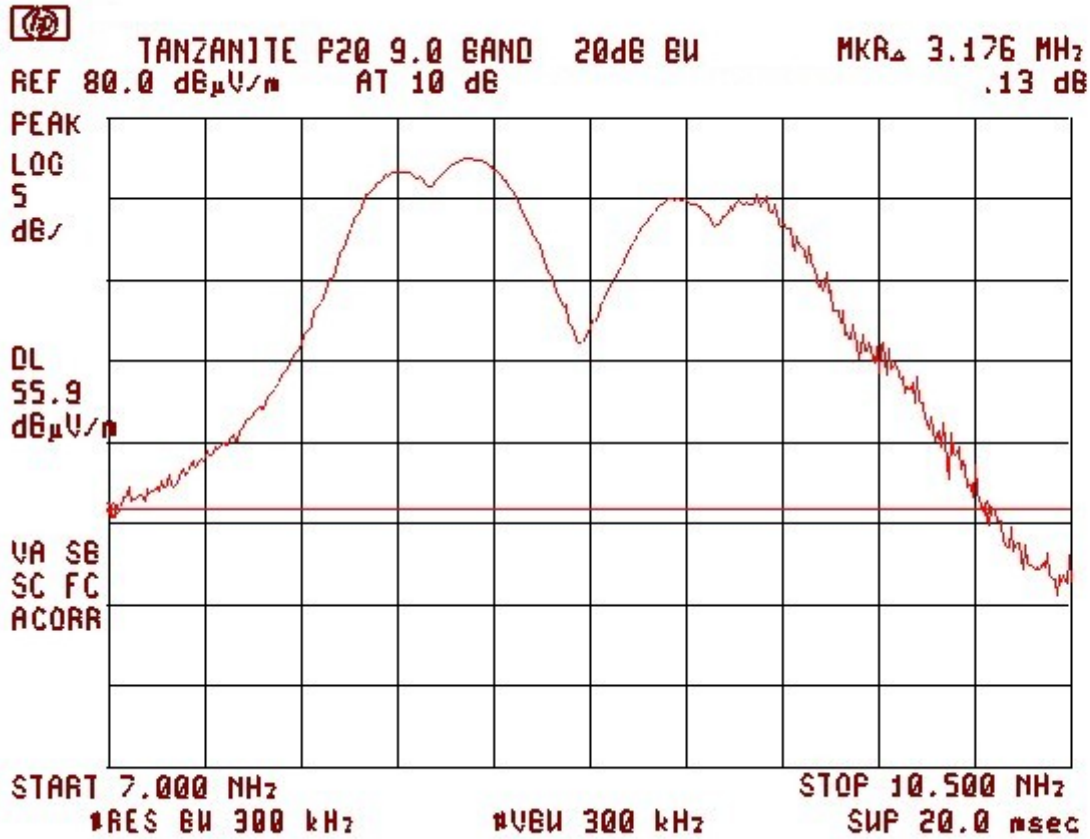
Emission Bandwidth
P-20 9.0 Band
6 dB Bandwidth



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NOTES:

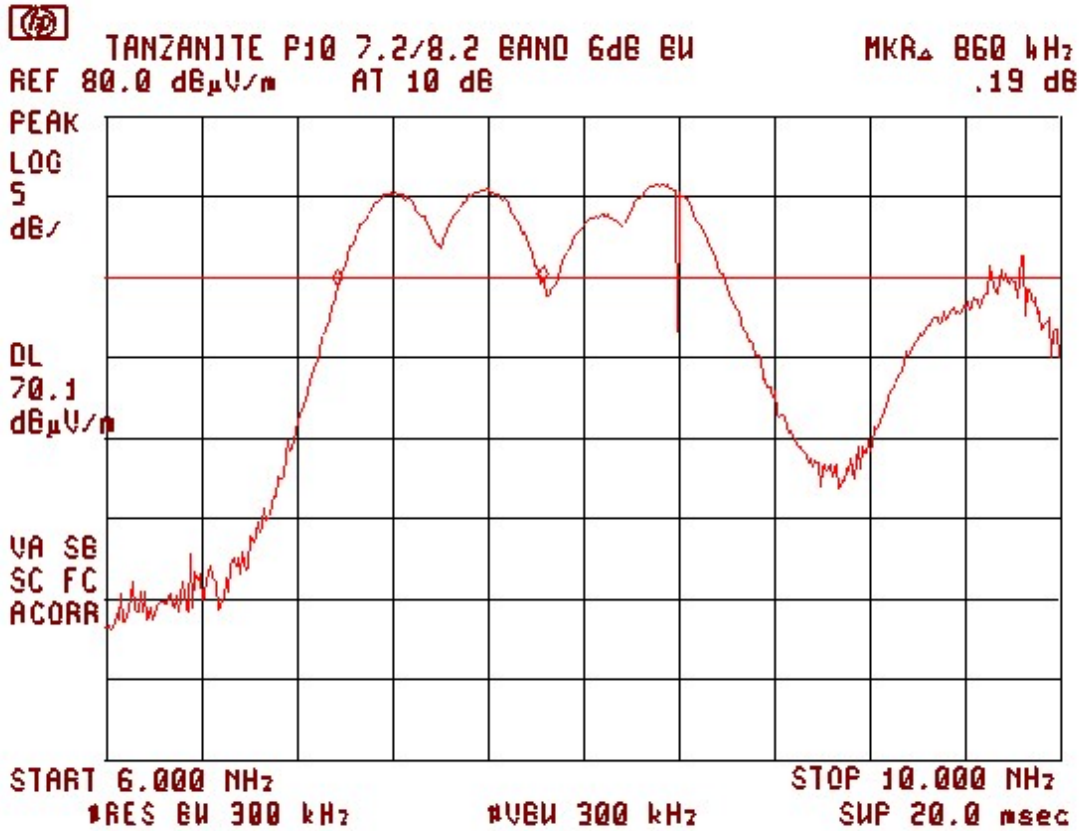
Emission Bandwidth
P-20 9.0 Band
20 dB Bandwidth



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NOTES:

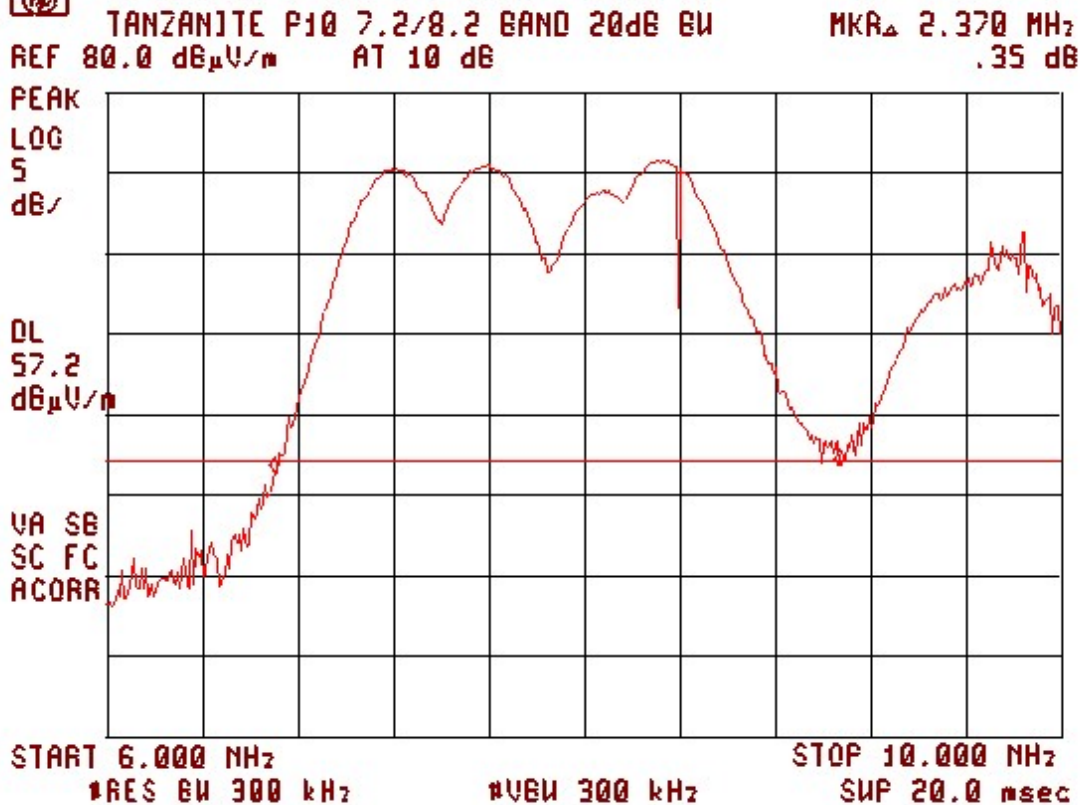
Emission Bandwidth
P-10 7.2/8.2 Band
6 dB Bandwidth



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NOTES:

Emission Bandwidth
P-10 7.2/8.2 Band
20 dB Bandwidth



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NOTES:

Emission Bandwidth
 G-20 8.2 Band
 6 dB Bandwidth

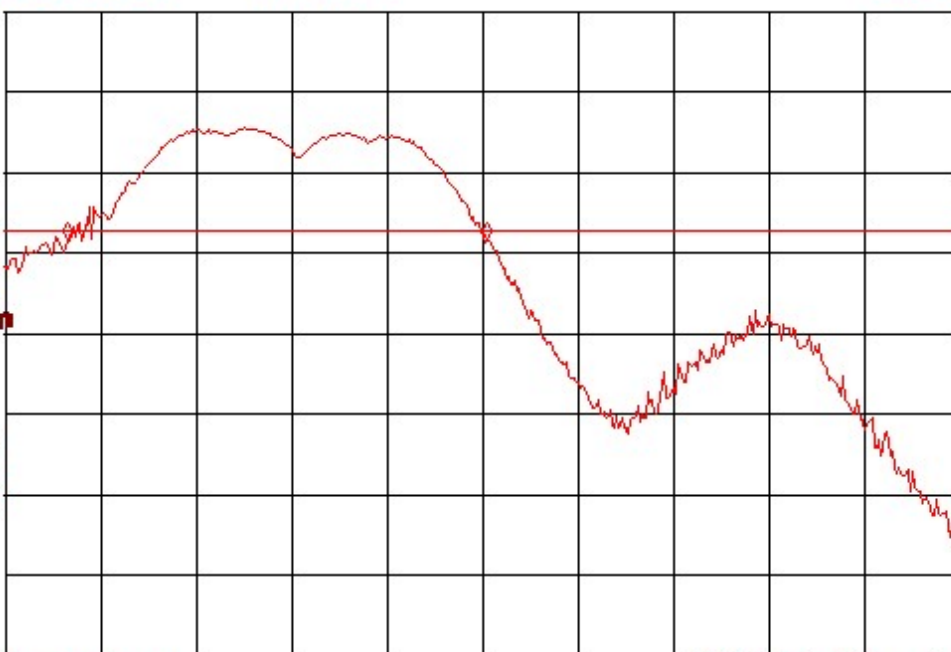


CHECKPOINT TANZANITE G20 8.2 BAND 6dB BW MKR Δ 1.144 MHz
 REF 85.0 dB μ V/m AT 10 dB .01 dB

PEAK
 LOG
 S
 dB/

DL
 71.4
 dB μ V/m

VA SB
 SC FC
 ACORR



START 7.400 MHz STOP 10.000 MHz
 RES BW 300 kHz VBW 300 kHz SWP 20.0 msec

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NOTES:

Emission Bandwidth
G-20 8.2 Band
20 dB Bandwidth

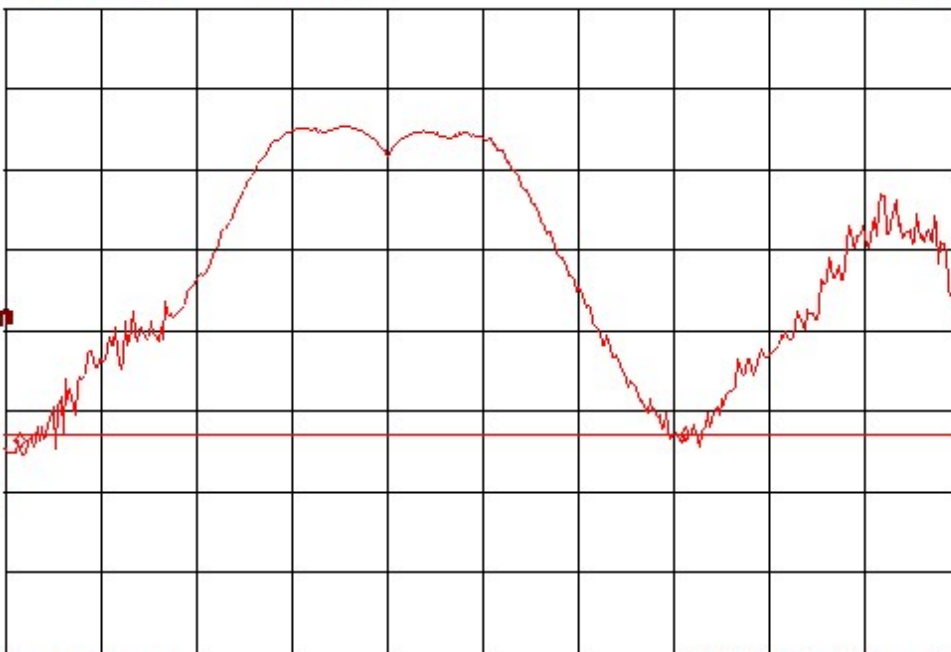


CHECKPOINT TANZANITE G20 8.2 20dB BW MKR Δ 2.093 MHz
REF 85.0 dB μ V/m AT 10 dB .38 dB

PEAK
LOG
S
dB/

DL
58.6
dB μ V/m

VA SB
SC FC
ACORR



START 7.000 MHz

#RES BW 300 kHz

#VBW 300 kHz

STOP 10.000 MHz

SUP 20.0 msec

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NOTES:

Emission Bandwidth
G-20 9.0 Band
6 dB Bandwidth

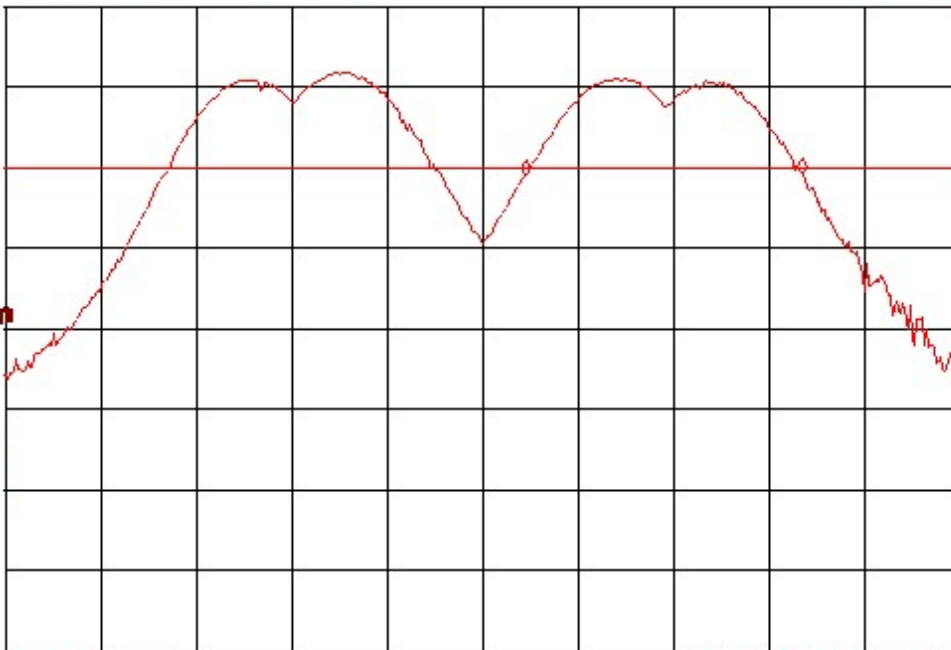


CHECKPOINT TANZANITE G20 9.0 BAND 6dB BW MKR Δ 754 kHz
REF 85.0 dB μ V/m AT 10 dB .22 dB

PEAK
LOG
S
dB

DL
75.0
dB μ V/m

VA SB
SC FC
ACORR



START 7.400 MHz STOP 10.000 MHz
RES BW 300 kHz RES BW 300 kHz SUP 20.0 msec

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NOTES:

Emission Bandwidth
G-20 9.0 Band
20 dB Bandwidth

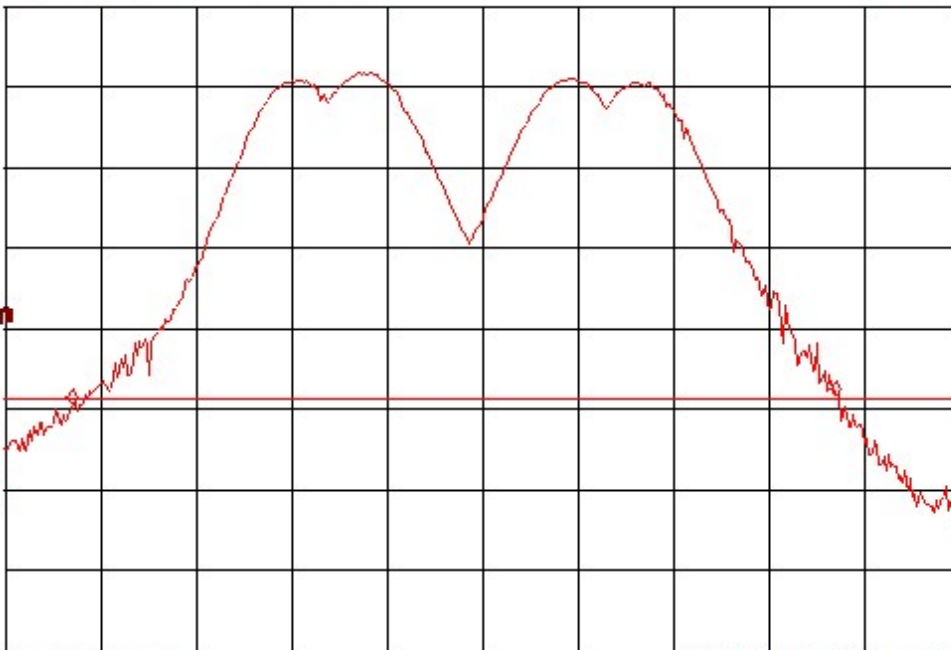


CHECKPOINT TANZANITE G20 9.0 20dB BW MKR Δ 2.800 MHz
REF 85.0 dB μ V/m AT 10 dB .43 dB

PEAK
LOG
S
dB

DL
60.7
dB μ V/m

VA SB
SC FC
ACORR



START 7.000 MHz STOP 10.500 MHz
RES BW 300 kHz VBW 300 kHz SWP 20.0 msec

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NOTES:

Emission Bandwidth
S-10 8.2 Band
6dB Bandwidth

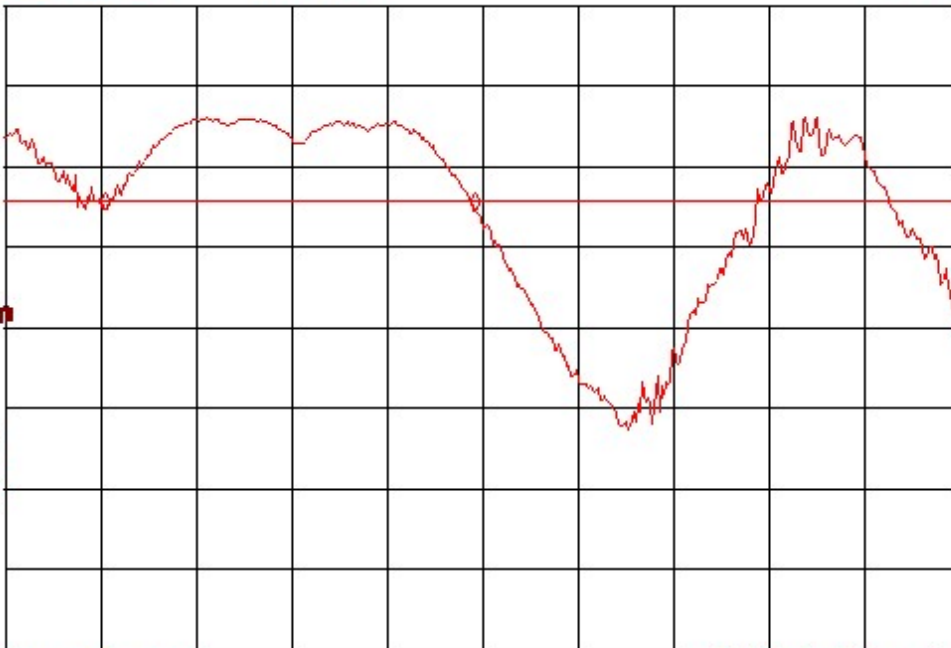


TANZANITE S10 8.2 BAND 6dB BW
REF 80.0 dB μ V/m AT 10 dB MKR Δ 1.000 MHz
.07 dB

PEAK
LOG
S
dB

DL
67.9
dB μ V/m

VA SB
SC FC
ACORR

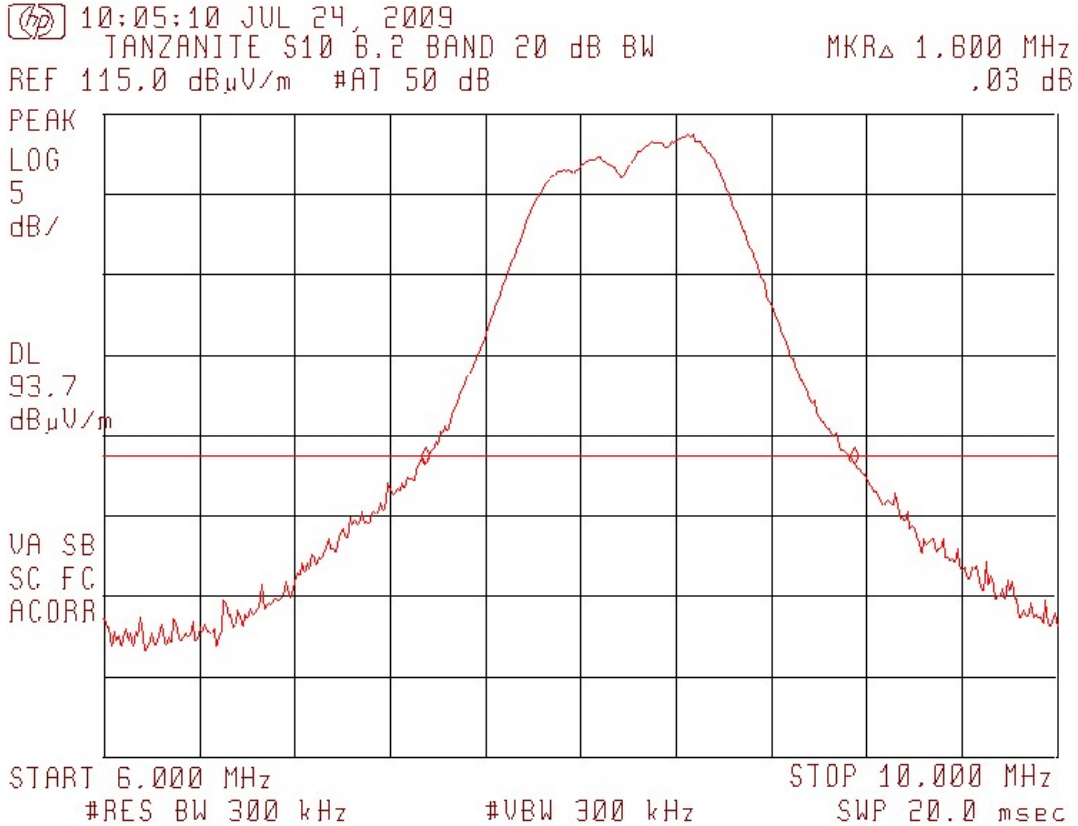


CENTER 8.700 MHz
RES BW 300 kHz
SPAN 2.600 MHz
SUP 20.0 msec

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NOTES:

Emission Bandwidth
S-10 8.2 Band
20dB Bandwidth



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Band Edge Measurement							
Standard:	47 CFR FCC Part 15.215 /RSS-210			PRESCAN or FINAL:		Final	Date: 7/17/2009
Device Tested:	Evolve P20 PAB + SAB 8.2 Band TX=31, 9.0 Band TX=31, P10 7.2/8.2 band tx=31			Distance:		10m	
Measured Level							
Meas #	TX Band	-6dB Low End (MHz)	-6dB High End (MHz)	Measured Bandwidth (MHz)	-20dB Low End (MHz)	-20dB High End (MHz)	Measured Bandwidth (MHz)
RBW = 300kHz VBW=300kHz (FCC Settings)							
1	8.200	7.735	8.695	0.960	7.255	9.145	1.890
2	9.000	8.811	9.664	0.853	7.018	10.194	3.176
3	7.2/8.2	6.970	7.830	0.860	6.700	9.070	2.370
Tested by: David Hollis							
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009							

Band Edge Measurement							
Standard:	47 CFR FCC Part 15.215 /RSS-210			PRESCAN or FINAL:		Final	Date: 7/15/2009
Device Tested:	Evolve G20 PAB + SAB 8.2 Band TX=27, 9.0 Band TX=27			Distance:		10m	File:
Measured Level							
Meas #	TX Band	-6dB Low End (MHz)	-6dB High End (MHz)	Measured Bandwidth (MHz)	-20dB Low End (MHz)	-20dB High End (MHz)	Measured Bandwidth (MHz)
RBW = 300kHz VBW=300kHz (FCC Settings)							
1	8.2	7.569	8.713	1.144	7.045	9.138	2.093
2	9.0	8.82	9.57	0.75	7.25	10.05	2.80
Tested by: David Hollis							
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009							

Band Edge Measurement							
Standard:	47 CFR FCC Part 15.215 /RSS-210			PRESCAN or FINAL:		Final	Date: 7/21/2009
Device Tested:	Evolve S10 PAB + SAB 8.2 Band TX=31			Distance:		3m	File:
Measured Level							
Meas #	TX Band	-6dB Low End (MHz)	-6dB High End (MHz)	Measured Bandwidth (MHz)	-20dB Low End (MHz)	-20dB High End (MHz)	Measured Bandwidth (MHz)
RBW = 300kHz VBW=300kHz (FCC Settings)							
1	8.2	7.673	8.681	1.008	7.350	9.150	1.800
Tested by: David Hollis							
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